News of the Industry Begins Page 458

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# AUTOMOTIVE INDUSTRIES

Volume 60
Number 11

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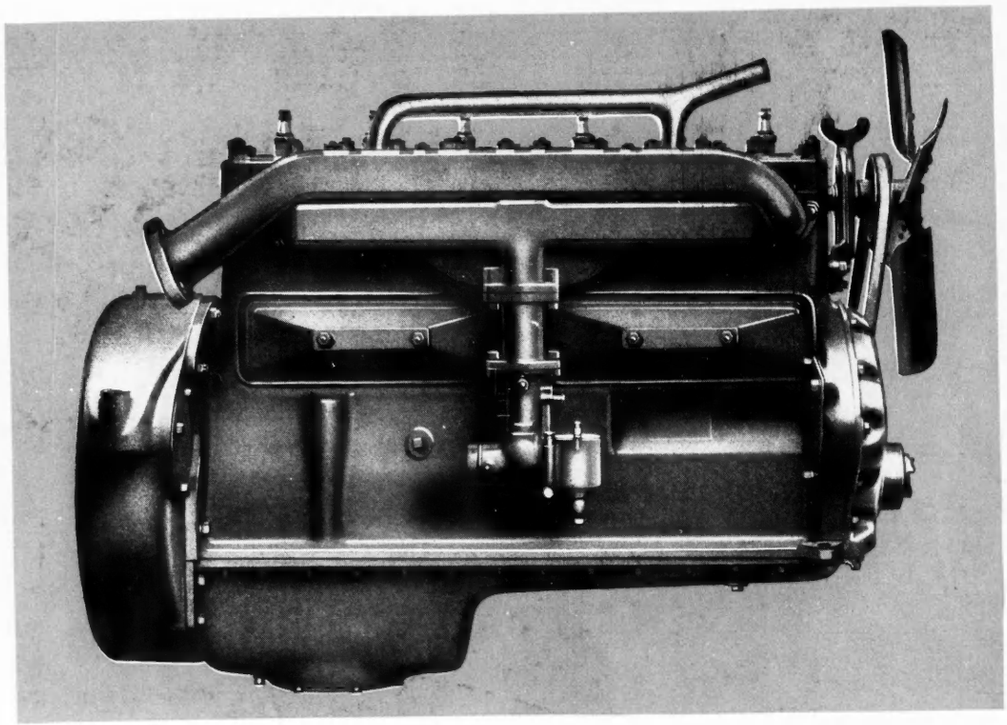

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Vol. 60 No. 11

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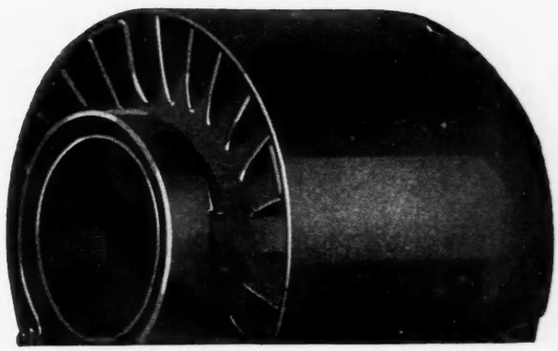

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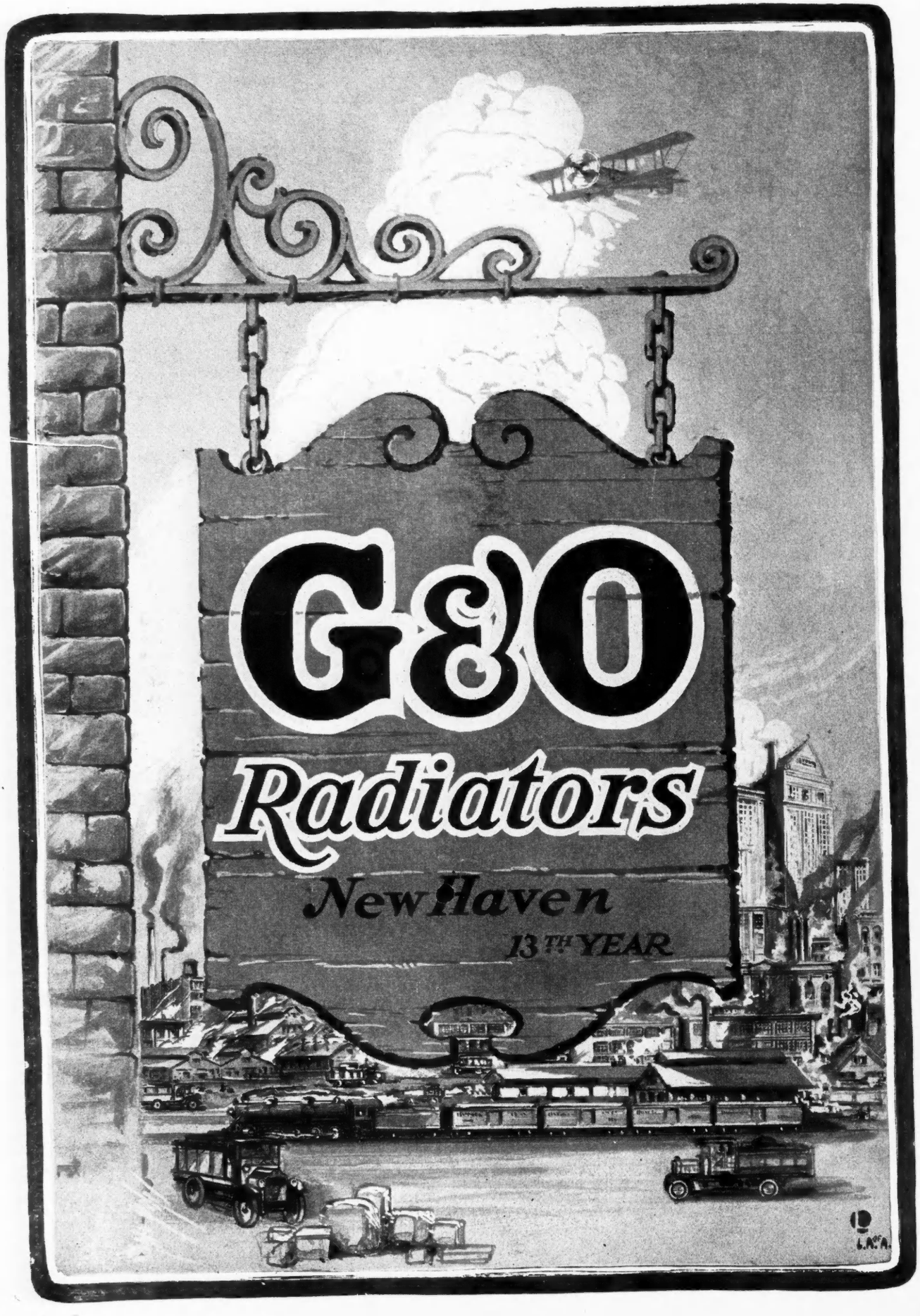
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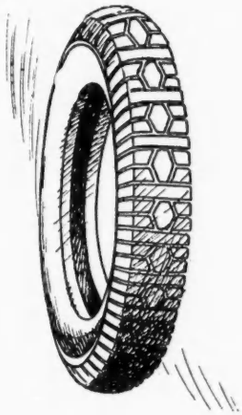
AUTOMOTIVE INDUSTRIES

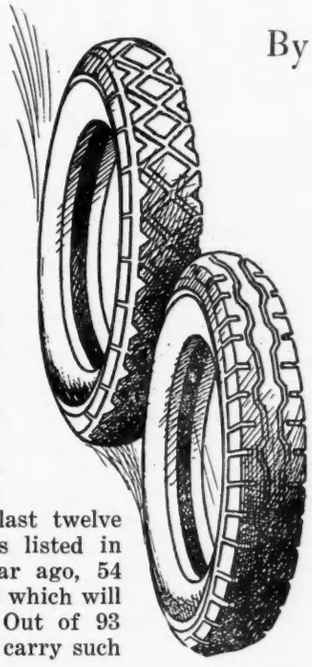
VOLUME 60 *Philadelphia, Saturday, March 16, 1929* NUMBER 11



# Tire Standardization

*Despite favorable expressions on the subject a year ago by responsible executives, statistics show the trend has been away from uniformity of wheels.*

By P. M. Heldt



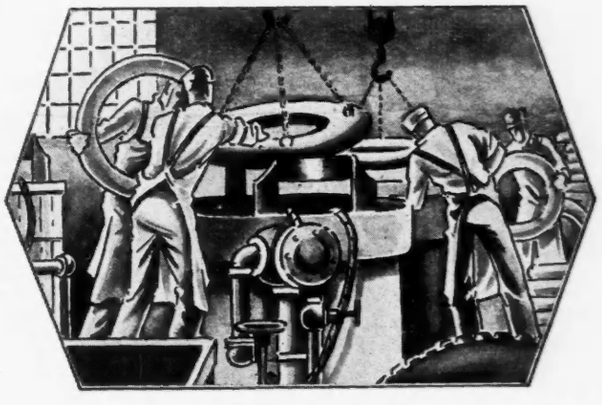
JUST about a year ago, a large proportion of the chief engineers of passenger car companies joined in discussion at the S.A.E. annual meeting in Detroit and, generally speaking, seemed to approve heartily the balloon tire standardization program laid before them by the Society at that time. It looked as though real, practical progress was about to be achieved in concentration on fewer sizes of balloon tires.

The higher promise of that meeting does not seem to have been fulfilled in the last twelve months. Out of 90 models listed in Chilton specifications a year ago, 54 carried balloon tires of sizes which will fit S.A.E. standard rims. Out of 93 models listed today, only 53 carry such tires.

Few subjects that have been taken up by standardizing bodies have proved as difficult to deal with as has the balloon tire. This type of tire came into use very rapidly about five years ago. As nearly all of the automobile manufacturers became interested, and most of the tire makers took up the production of the tire nearly simultaneously, there was a great diversity of sizes right from the beginning, and the number increased rather than lessened. Previously, with the high-pressure type of tires, tire widths had been limited to full inches and halves, but with the introduction of low pressure tires, fractional sizes were adopted, so there was a chance for an indefinite multiplication of sizes within the limits required for passenger car equipment.

It soon was realized by the tire industry that unchecked multiplication of sizes would be very detrimental to its interests, and an effort at standardization was made shortly after the introduction of the low-pressure tire. In 1924, the Rubber Association of America, Inc., had twenty-four sizes of low-pressure tires on its approved list, and it is indicative of the changes which have taken place in the balloon tire field since then that not a single one of the sizes in that list is in the approved list for 1929.

The subject of a reduction in the number of sizes was taken up at a meeting of the Detroit Section of the S.A.E. held on November 22, 1927, at which the tire manufacturers, the car manufacturers and the Department of Commerce were represented. The burdens which the situation imposed on the tire industry were fully gone into at the meeting by B. J. Lemon of the U. S. Rubber Co., who said, among other things, that only a very small proportion of tire dealers had capital enough to enable them to keep a full stock of all sizes of balloon tires, and these few were wise enough not to do it. At the time this meeting was held, forty different sizes of balloon tires were needed for original



equipment, and the number still was growing. A paper by Henry M. Crane sought to explain the reasons for the multiplication of sizes. Mr. Crane said that front end vibration had to be coped with, that tire size was important in determining the appearance of a car, and that the general movement toward smaller wheel diameters had had its influence.

The automobile buying public, he said, had shown no interest in tire size standardization. He gave it as

his opinion that rim standardization should precede tire size standardization.

This meeting was followed two months later by the session of the 1928 annual meeting already summarized. There, the whole subject was discussed from various angles, and finally a list of rims for low pressure tires was adopted. While the tire sizes which fit the rims of the Recommended Practice are given, it is specifically stated that these tire sizes form no part of it. A large number of engineers of automobile companies were in attendance at the meeting, and while there was some opposition to the proposed list, the consensus of opinion seemed to be strongly in favor of it, and the industry was urged vigorously to adopt those sizes and discontinue the use of the irregular ones.

A list of the tires which will fit S.A.E. low-pressure rims is published herewith, both the old and the new designations being given for each size. It will be seen that the list includes eight different sizes.

List of Tires Fitting S.A.E. Rims for Low-Pressure Tires

| | | | |
|---|---|---|---|
| 28 by 5.25 | (5.25-18) | 30 by 6.00 | (6.00-18) |
| 29 by 5.00 | (5.00-19) | 31 by 6.00 | (6.00-19) |
| 29 by 5.50 | (5.50-19) | 32 by 6.00 | (6.00-20) |
| 30 by 4.50 | (4.50-21) | 32 by 6.75 | (6.75-20) |

The Rubber Association of America, as already mentioned, has an approved list of sizes of balloon tires for original equipment. This list for 1929 is shown in the accompanying table.

The list, it will be observed, is a considerably larger one than that of balloon tires fitting S.A.E. rims, containing twenty-one different sizes (unless the 6.75 and 7 in. tires are regarded as one and the same).

A year has passed since the S.A.E. list went into effect and it is interesting to see the changes. In the AUTOMOTIVE INDUSTRIES STATISTICAL ISSUE for 1928, as noted in the opening paragraph of this article, 90 different models of passenger cars were listed, and of those 54 carried balloon tires of sizes which will fit the S.A.E. rims. The latest list of passenger cars of the Chilton Class Journal Specifications Department includes 93 models, and of these 53 carry tires that fit the S.A.E. rims. Thus, instead of a movement toward the standard sizes, there has been a movement away from them. From 60 per cent in 1928, the use of the listed sizes has decreased to 57 per cent in 1929.

The following changes took place between 1928 and 1929 with respect to individual sizes:

The 28 by 5.25 in. size, used on seven models in 1928, is used on none in 1929.

The 29 by 5 in. size, used by four in 1928, is used on 10 in 1929.

The 29 by 5.50 in. size, used on seven in 1928, is used on 10 in 1929.

The 30 by 4.50 in. size used on two in 1928, is used on one in 1929.

The 30 by 6 in. size, used on seven in 1928, is used on eight in 1929.

The 31 by 6 in. size, used on nine in 1928, is used on eight in 1929.

The 32 by 6 in. size, used on 11 in 1928, is used on 12 in 1929.

The 32 by 6.75 in. size, used on seven models in 1928 is used on four in 1929.

Of the above eight sizes, all but the last are included in the Rubber Association's approved list for 1929. Fourteen other sizes not included in the S.A.E. list were used in 1928, while 17 other sizes are being used in 1929.

Since the Rubber Association list includes 19 (or 21) sizes, against only eight in the S.A.E. list, it is natural that a much larger proportion of the total number of 1929 models should be equipped with tires approved by the Rubber Association. Of the 93 models listed, 80 carry tires approved by the Rubber Association, while 13 have non-approved sizes. The relative popularity of the different tire sizes may be seen from the following compilation: Number of models using tires approved by the Rubber Association.

| | | | | | |
|---|---|---|---|---|---|
| 4.50-20 | (1) | 5.25-19 | (1) | 6.50-18 | (4) |
| 4.50-21 | (1) | 5.50-18 | (11) | 6.50-19 | (0) |
| 4.75-19 | (1) | 5.50-19 | (0) | 6.50-20 | (6) |
| 4.75-20 | (3) | 5.50-20 | (3) | 6.75-18 | (2) |
| 5.00-19 | (10) | 6.00-18 | (8) | 6.75-20 | (0) |
| 5.00-20 | (2) | 6.00-19 | (8) | 7.00-18 | (3) |
| 5.25-18 | (0) | 6.00-20 | (14) | 7.00-20 | (1) |

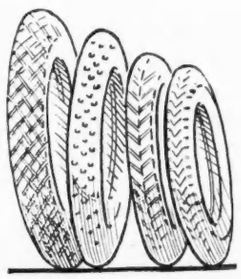
In addition to the above sizes (the Rubber Association list), seven others are now fitted to stock models, including one which fits an S.A.E. rim. This one is used on four models, while of the other six one is used on three models one on two and four on one each.

If the list is revised again, it would seem that the 5.25-18 size should be eliminated, as this is not used now by any car maker, while in 1928 it was still used on seven models. As to what other sizes could be eliminated from the S.A.E. list, it is difficult to judge from the data available and given herewith.

It would seem that all requirements with respect to balloon tires for passenger cars, which covers load capacities ranging from about 600 to about 1600 lb. per tire, could be covered adequately by a much smaller number of sizes than 19. But the larger manufacturers, whose annual consumption of tires of a given size aggregates several hundred thousand, are not so vitally interested in standardization. It would appear that those makers chose a tire entirely with regard to its effect on the appearance and the riding comfort of the car, and that if a non-standard size seems to give the best results they do not hesitate to adopt it. Of the present Rubber Association approved sizes, however, there are four that are not being used on any American passenger car having an appreciable production.

ORIGINAL EQUIPMENT TIRE MANUFACTURING INDUSTRY
BALLOON TIRE SIMPLIFICATION FOR PASSENGER CARS—1929. PRESENT APPROVED 19 SIZES

| Rim Diam. | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 6.00 | 6.50 | 7.00 |
|---|---|---|---|---|---|---|---|---|
| 18 | ..... | ..... | ..... | 5.25-18 | 5.50-18 | 6.00-18 | 6.50-18 | 7.00-18 |
| | ..... | ..... | ..... | 28x5.25 | 28x5.25 | 30x6.00 | 30x6.50 | 30x6.75 |
| 19 | ..... | 4.75-19 | 5.00-19 | 5.25-19 | 5.50-19 | 6.00-19 | 6.50-19 | ..... |
| | ..... | 28x4.75 | 29x5.00 | 29x5.25 | 29x5.50 | 31x6.00 | 31x6.50 | ..... |
| 20 | 4.50-20 | 4.75-20 | 5.00-20 | ..... | 5.50-20 | 6.00-20 | 6.50-20 | 7.00-20 |
| | 29x4.50 | 29x4.75 | 30x5.00 | ..... | 30x5.50 | 32x6.00 | 32x6.50 | 32x6.75 |
| 21 | 4.50-21 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | 30x4.50 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |



# Automotive Stocks *Recover Quickly After February* Market Slump

***Passenger car shares declined an average of 6.92 per cent and those of four truck companies represented 8.98 per cent in recent period of depreciation.***

*By* A. Burdet Crofoot

PUBLIC confidence in market securities as an investment was reflected last month when the stock market registered a radical decline during one week. With stock speculation having run rife for over a year, two factors appeared in the market during the first week of February which produced a marked setback in the hitherto rapidly advancing prices.

On Feb. 6 the Bank of England raised its rediscount rate from 4½ to 5½ per cent, thereby encouraging the retention of British funds at home and the diversion of a certain amount of American money to that market. On the same date our own Federal Reserve Board sent a letter to its member banks warning them of the danger of excessive use of bank credit in stock speculation. This letter declared that "The extraordinary absorption of funds in speculative security loans which has characterized the credit movement during the last year or more deserves particular attention lest it become a decisive factor working toward a still further firmness of money rates to the prejudice of the country's commercial interests."

These two factors, occurring almost simultaneously, produced a psychological effect of great timidity among security traders with the result that the stock market opened on Thursday morning, Feb. 7, with prices on almost the complete list anywhere from 2 to 17 points below the closing prices of Wednesday. Continued activity hammered quotations down still further during the next two days so that stock indices showed the lowest prices for the complete market range for the month of February on Friday, Feb. 8. The highest index for the month had been established on Tuesday of the same week, February 5.

During the four days from Feb. 5 to Feb. 8, inclusive, the representative motor stocks listed in the accompanying table registered an average decline of 7.41 per cent. In no case did the decline in motor stocks exceed 12 per cent, and in many cases it ran around 5 per cent. The greatest change was registered during those days in Packard stock, which dropped 14 points, but which, on account of the high prices of the stocks, represented only a 9.8 per cent decrease. The greatest decreases in passenger car stocks on a percentage basis were registered in Chrysler, which dropped 11 per cent, and Studebaker, which dropped 11.1 per cent. Yellow Truck Class B stock, the only security traded in on the Stock Exchange for that company, registered a decline of 11.97 per cent.

The average decline for passenger car stocks during the period was 6.92 per cent, while the average decline for the four truck companies represented was 8.98 per cent. It is noteworthy that by the end of February practically all motor stocks had recovered a large portion of their loss, although many of those stocks still were slightly below the high point of Feb. 5. Some of these stocks went even lower than the figures established for Feb. 8, but all have recovered somewhat.

Frazier Jelke & Co., a New York Stock Exchange house, has a monthly index for 100 representative common stocks. This index shows an average decline for the month of February of 1.76 per cent. Among the securities included in this list of 100 are seven motor Issues, namely: Chrysler, General Motors, Graham-Paige, Mack, Nash, Packard and Studebaker. These seven registered a decline during the month of approximately eight-tenths of one per cent, showing a stronger position on the market than the average, outranking the merchandising group.

## Reaction of Representative Motor Stocks in February Market Flurry

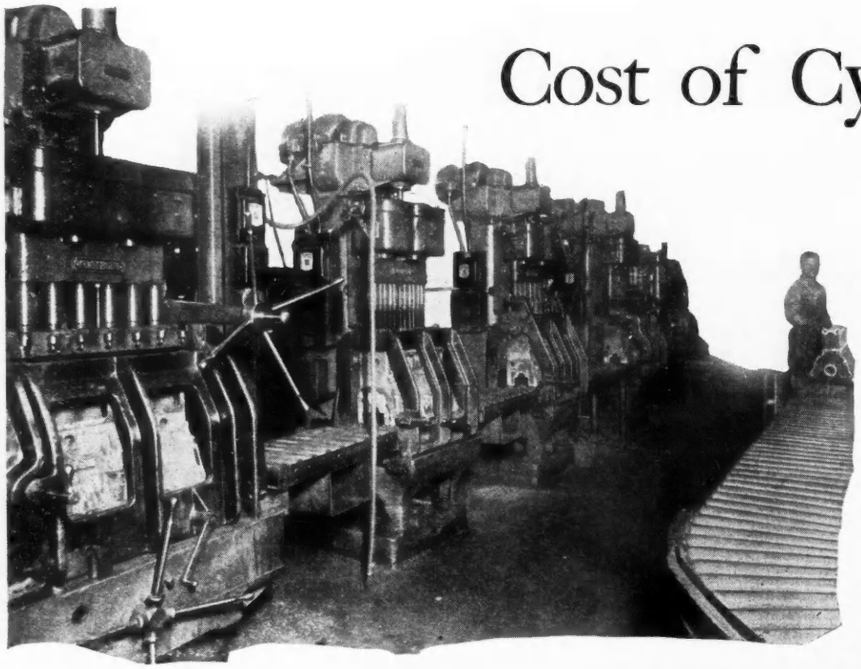
| Company | No. of Shares | Feb. 5 | Feb. 8 | Change | Loss | Percentage |
|---|---|---|---|---|---|---|
| Auburn Auto. Co. | 141,450 | 147¾ | 139 | 8¾ | $1,238,000 | 5.9 |
| Chrysler Sales Corp. | 4,423,484 | 113¾ | 101¼ | 12½ | 55,300,000 | 11.0 |
| Durant Motors, Inc. | 1,852,413 | 17¾ | 16⅝ | ⅞ | 1,622,000 | 4.92 |
| General Motors | 43,500,000 | 84¾ | 79⅝ | 4⅞ | 211,000,000 | 5.75 |
| Graham-Paige | 1,430,863 | 49¾ | 45 | 4¾ | 6,800,000 | 9.54 |
| Hudson Motor Car Co. | 1,596,660 | 89⅛ | 84⅛ | 5 | 6,983,330 | 5.61 |
| Hupp Motor Car Corp. | 1,080,809 | 78⅞ | 73⅛ | 5¾ | 6,320,000 | 7.3 |
| Marmon Motor Car Co. | 200,000 | 72 | 69 | 3 | 600,000 | 4.17 |
| Nash Motors Co. | 2,730,000 | 113⅞ | 104½ | 9⅜ | 2,697,000 | 9.72 |
| Packard Motor Car Co. | 3,004,264 | 143 | 129 | 14 | 4,210,000 | 9.8 |
| Reo Motor Car Co. | 2,000,000 | 28¼ | 27¼ | 1 | 2,000,000 | 3.57 |
| Studebaker Corp. of Amer. | 1,893,750 | 95¾ | 85⅛ | 10⅝ | 2,070,000 | 11.1 |
| Willys-Overland, Inc. | 2,526,684 | 31¼ | 29½ | 1¾ | 4,425,000 | 5.69 |
| Average | | | | | | 6.92 |
| Brockway Motor Truck Corp. | 179,891 | 69⅛ | 64⅛ | 5 | 8,994,550 | 7.23 |
| Mack (Intern'l Motor Co.) | 755,624 | 114¾ | 106¼ | 8½ | 6,420,000 | 7.4 |
| White Motor Co. | 800,000 | 52⅜ | 47½ | 4⅞ | 3,890,000 | 9.32 |
| Yellow Truck (Class B) | 1,300,000 | 41¾ | 36¾ | 5 | 6,500,000 | 11.97 |
| Average | | | | | | 8.98 |
| Grand Average | | | | | | 7.41 |

**Note:** Figures representing loss in market value of securities are approximate, being accurate for the first three digits.

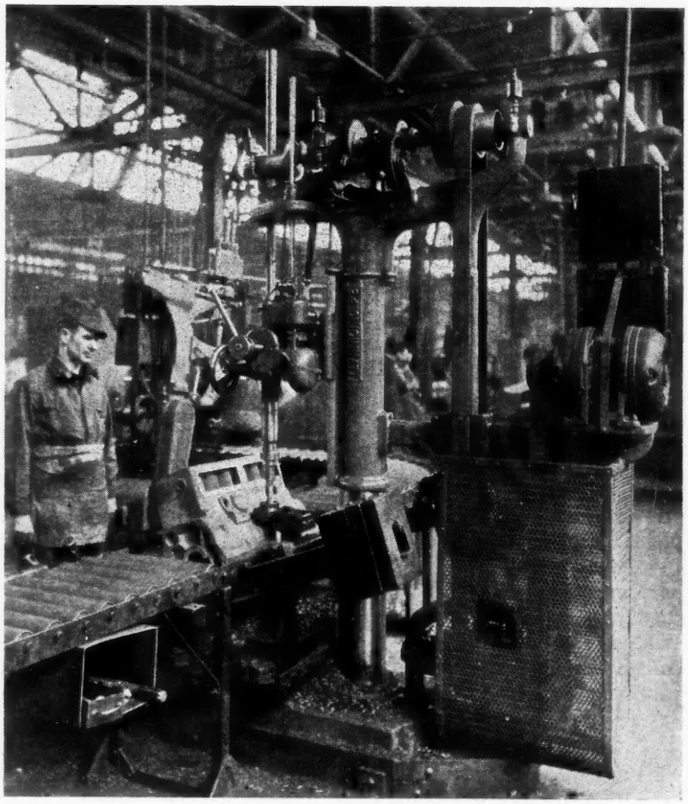
*Automotive Industries*
*March 16, 1929*

# Cost of Cylinder Block Through

*By*
ATHEL F.
DENHAM



*Wherever possible machine tools straddle the conveyor line. Here are shown operations for machining valve guides and throats*



*This operation, machining of the crankcase breather flange, is an example of ingenious "tailoring." The counterweighted machine-tool fixture is part of the conveyor line*

IT long has been realized that one of the best ways of cutting production cost is by the elimination of material handling and all not strictly productive manual labor. Much has been, and is being done, along those lines. Perhaps one of the best examples of the possibilities in this respect is found in the machining line for cylinder blocks of the smaller Graham-Paige cars. The floor plan layout is shown on the accompanying diagram. The design or "tailoring" of this line, as shown in the accompanying floor plan layout, is based on the following fundamentals, among others:

1. All manual handling of blocks between operations must be reduced to the absolute minimum.
2. This also requires the elimination of loading hoists wherever possible, and where hoists have to be used, they should be as automatic as possible.
3. Hand-machining operations should be eliminated as far as possible to enable more efficient use of the workman's time.
4. Cylinder blocks should travel down a conveyor with the right side up and the right end forward, and machine tools should be arranged to eliminate reversing or turning over blocks as far as possible.
5. Loading of machine tools should be as simple as possible.
6. Machine tools should be so laid out that controls are accessible from the loading position.

In the actual application of those principles to the cylinder block line, the first requirements has been met by the provision of an almost continuous roller conveyor at the side of which are grouped the machine tools in sufficiently close consecutive order to make unnecessary intermediate handling between operations.

The second requirement is met by adjusting all machine tools to the proper height, so that the blocks do not have to be raised or lowered, except in a few instances where this is not possible. The latter include the Ingersoll drum millers (2) near the head of the line, for machining tops and bottoms of the blocks, and the Ingersoll drum miller (6) for milling the block ends. At those points, hoists have to be used, but they are air-operated and so adjusted that they automatically lift and lower the blocks to the correct height for load-

# *Machining* Reduced by *Graham-Paige Lessening* of Manual Handling

*Conveyors, hoists and straddling machines feature machining line for engine blocks of the smaller cars, which is designed for handling 256 units per day.*

ing and replacing on the conveyor. They are, of course, mounted on overhead monorails. The efficiency of this particular installation is indicated by the fact that the operator assigned to each drum miller at (2) also takes care of the loading, unloading and operation of a Sunstrand Rigimil miller (3) for machining the water jacket side plate flange.

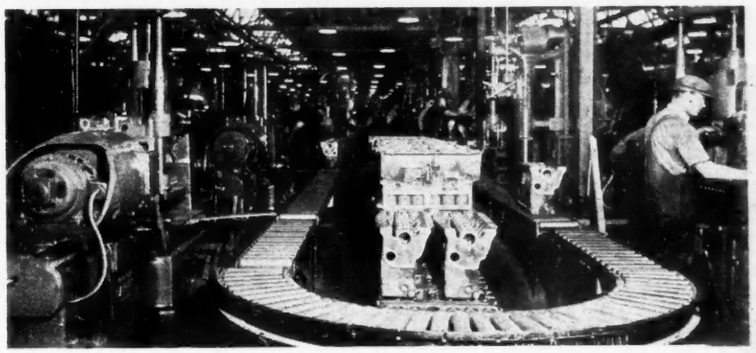
The third requirement has been met by the use of multiple head drills wherever possible. Where automatic machine tool operation is not justified, hand-operated machines are so located that operators tending some of the slower automatic tools, performing relatively large operations, are able during the cutting time to take care of such hand operations. The latter are not indicated on the diagram.

The fourth requirement, keeping the block traveling down the conveyor with the right side up and the right end forward, required considerable ingenuity in the locating of machine tools and consecutive operations. That it has been well achieved, however, is indicated by the fact that the blocks during the entire process are turned over only twice. At those points, as shown near operations 19 and 31, turning over is simplified by overlapping two conveyor ends, closely adjacent.

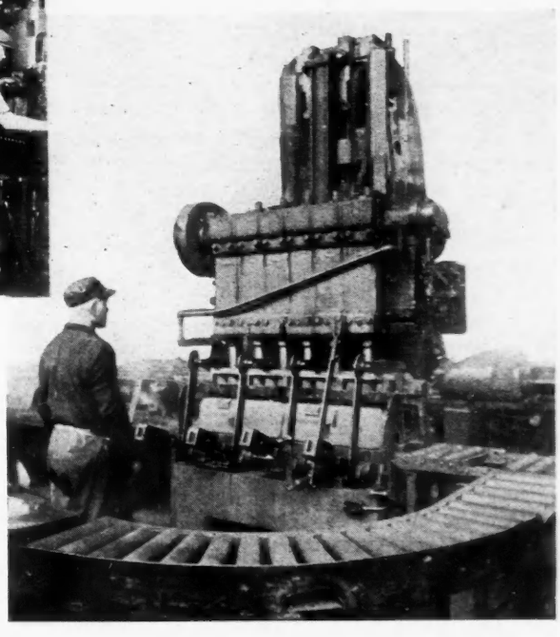
The fifth fundamental established by the Graham-Paige production planning division is met in about two-thirds of the cases by having the machine tools straddling, or forming a part of the conveyor. Thus at (3) the feed tables of the millers form an integral part of the conveyor system. The many tools which straddle the conveyor are indicated in the drawing. In some of these, where dowel holes are used for locating, a counter-weighted or cam operated locating fixture, lever-operated, is swung up below and extended through the conveyor. At others, the locating fixtures are so adjusted as to obviate the removal of the blocks from the conveyor line for the machining operation, the blocks being locked in place while on the conveyor.

At points where a straddling of the conveyor was impossible because of the design of the machine tool, as in the bearing boring mills which require side loading, and in other places where more than one machine tool had to be used for the same operation because of insufficient capacity at peak production of a single tool, provision was made for loading the tools without lifting the block. This generally was done by providing two "bridge" bars hinged to the side of the conveyor frame in such a manner that the ends rested on the machine tool fixture, or vice-versa, the tops of the bars being flush with the face plate of the loading fixture and conveyor. Another method, as at (11) and (12), is to provide turntables in the conveyor.

In one or two cases, where operations have to be performed at an angle to the block, as in the machining of the crankcase breather flange, special provision had to be made to facilitate handling

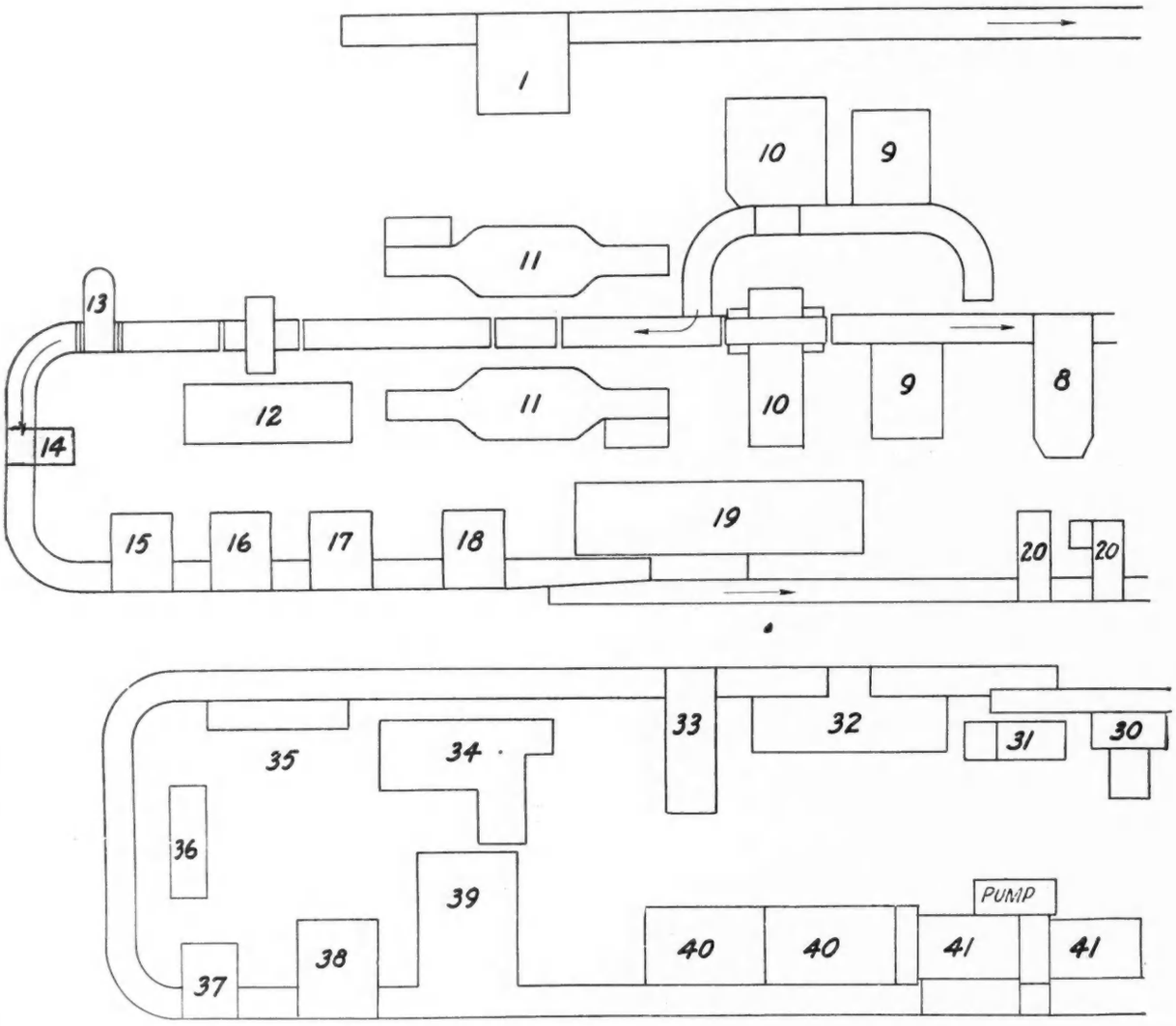


*Above: General view of a section of the cylinder block machining line, showing turntables provided in the conveyor line for loading the Barnes boring mill for finish boring of the crankshaft and camshaft holes. Note also hinged bridge bars at right*



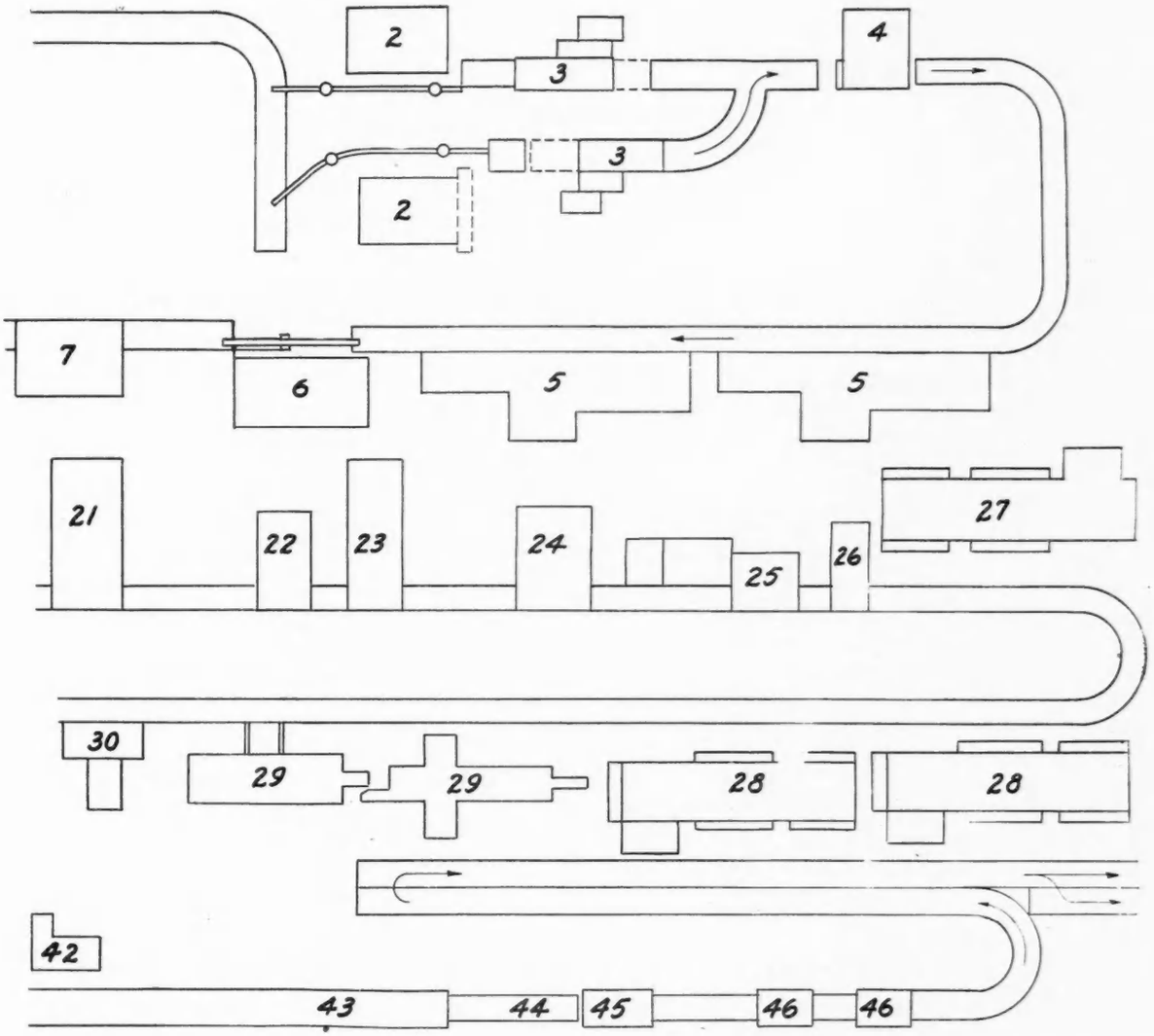
*Right: An interesting feature of this six-spindle boring machine for rough boring piston holes is that two blocks are bored at one time, cylinders 1, 3 and 5 in one, and 2, 4 and 6 in the other. This view also shows the re-converging of the conveyor line, split for this and the preceding operation to permit duplicate operations, and increased production*

# Floor Plan Layout of Machining Line for Cylinder




1. Paint inside.
2. Mill top and bottom. Ingersoll drum millers. (2).
3. Mill water jacket side plate flange. Sundstrand Rigimills. (2).
4. Drill and ream dowel holes and oil gage hole. Three head Edlund drill.
5. Mill bearing cap seats and manifold seats. Ingersoll Openside mills. (2).
6. Mill ends. Ingersoll drum mill.
7. Straddle mill main bearing and mill oil sling slot. Special Ingersoll.
8. Drill water holes in top. Bausch multiple drill.
9. Mill tappet bracket, oil relief and gas pump pads. Cincinnati four-spindle mills. (2).
10. First bore piston holes. Moline and Ingersoll six-spindle boring machines.
11. Drill two sides. Bausch two-way multiple drills. (2).
12. Tap two sides. Greenlee two-way tapper.
13. Drill counterbore and ream breather hole. 24 in. Cincinnati Bickford drill.
14. Drill oil return hole. Avey SS drill.
15. Spotface valve throats. Foote Burt six-spindle drill.
16. Rough bore valve throats. Foote Burt six-spindle drill.
17. Drill valve guide holes. Foote Burt 12-spindle drill.
18. Semi-finish ream valve guide holes and valve throats. Foote Burt 12-spindle drill.
19. Rough bore crankshaft hole, rough drill camshaft holes, counterbore rear camshaft hole and drill welsh plug holes in ends. Barnes horizontal boring mill.
20. Chamfer bottom of piston bores. Cincinnati and Fosdick drill.
21. Drill 26 and tap 29 holes in bottom Bausch multiple spindle drill.
22. Tap 2 holes, countersink 42, and counterbore and spotface oilgage hole in bottom. Hammond radial drill.
23. Tap 34 holes in bottom. Bausch multiple tapper.
24. Drill oil holes from crankshaft to camshaft bearings. Avey four-spindle drill.

# Blocks of the Smaller Graham-Paige Cars



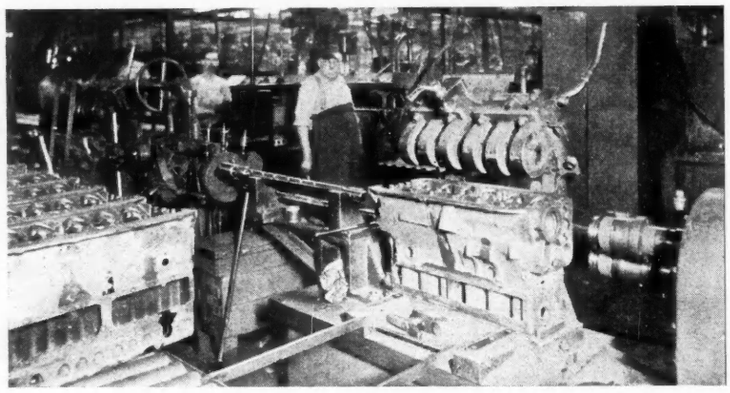

25. Assemble bearing caps. Special stand.
26. Drill oil wick holes. Cincinnati Bickford SS drill.
27. Second bore crankshaft and camshaft holes. Barnes horizontal boring mill.
28. Finish bore crankshaft and camshaft holes. Barnes horizontal boring mill. (2).
29. Finish ream crankshaft and camshaft holes. Rockford horizontal boring mills. (2).
30. Drill, bore and ream oil pump shaft hole. Snyder & Natco drills.
31. Straddle mill front crankshaft bearing. Fosdick radial.
32. Drill holes in front and rear end Fox 2-way multiple drill.
33. Drill distributor and 22 tap holes in top. Bausch multiple drill.
34. Drill spotface and chamfer fan bracket hole, drill tappet bracket, welsh plug, gas pump and 7/16 holes, and spotface 2 bosses. Fox 2-way multiple drill.
35. Tap holes in top ends and fan bracket stud and rear dowel holes in rear end. Natco 3-way tapper.
36. Tap tappet bracket screw holes. Fosdick radial.
37. Finish ream valve guide holes. Foote Burt drill.
38. Press in valve guide. Metalwood press.
39. Finish bore piston holes. Moline six-spindle drill.
40. Finish ream piston holes. Foote Burt and Moline six-spindle drills.
41. Hone piston holes. Barnes honing machine. (2).
42. Hone piston bores (repair operation). No. 45 Hamilton drill.
43. Wash. Blakleslee washer.
44. Finish ream holes in valve guides. Snyder SS drill.
45. Finish ream valve throats. Foote Burt 12-spindle drill.
46. Water test.

Nine hand operations, including chamfering and welsh plug assembly have been omitted.

of the block. In one case (13), a section of the conveyor was hinged at one side and counterweighted. A lever drops the other side of the conveyor platform until a built-in machine tool fixture engages the under side of the block along its milled face, locating from the dowel holes. The counterweight, of course, makes it easy to return the conveyor platform to its normal position after the operation.

In another similar operation (14), the same desired result, that of tipping the block, is achieved by mounting the drill head at an angle to the block, in which case the conveyor platform, of course, does not have to be swung down. In the spray booth (1), a tipping fixture, also counterweighted, is provided, in line with the conveyor, by means of which the block can be tipped up to enable spraying of the inside top parts of the water jackets. In this case, the fixture has to overbalance the counterweight slightly. In order that it would not tip over when the block is removed from the fixture and passed on to the next operation, a self-clamping hook is provided hooking onto the conveyor side rail in the normal horizontal position of the platform fixture. Releasing this hook permits the block to swing over of its own accord.

At other points, where particular conditions made it practically impossible to mount the machine tools high enough to have the loading fixture on the same plane with the conveyor, this fixture is slotted so that the bars on which the blocks are slid over from the conveyor line can be dropped down by a lever-operated cam action.



*A special machine developed on a Rockford boring mill base by Graham-Paige is used for finish reaming crank and camshaft holes. Note that the cutters are mounted in the fixture head. This mounting is in rubber. With the head down, the boring bar is slid through and engages all six cutters. Cutters for the stepped camshaft holes are mounted on the boring bar in the usual manner. Note also bridge bars for loading from conveyor*

With this type of layout, the usual machine tool controls were often found to be located in such a manner as to be relatively inaccessible, especially where the tool is closely adjacent to the conveyor line or partially straddling it. In those instances, extensions were provided for the controls, projecting beyond and below the conveyor so that the operator can load and operate the machines from the same position.

This is true, for instance, of operation (5), where the bearing cap seats and manifold sides are milled. In this case, moreover, it is necessary to tip the block over on its side, one of the few places in the line where that must be done. To do that, short curved slide bars connect the conveyor platform with the but slightly higher machine tool fixture plate, the block being tipped over against these slider bars and slid over onto the holding fixture, at the same time turning it over 90 degrees without lifting it. Unloading the fixture brings the block back to its original position, ready for the next operation.

Other interesting features of the line from a labor saving standpoint are found at the bearing cap mounting stand (25) and the reamer layout (29). The bearing cap stand is provided with a hinged head in grid form. Hydraulically-operated plungers are provided in this head to line up the bearing side faces with the corresponding faces in the cap-mounting bosses. The hydraulic system consists of a master cylinder and a number of wheel cylinders from a Lockheed hydraulic brake outfit. Another little feature of this installation is the provision of a flywheel on the air-operated nut tightener, which automatically tightens the bearing cap nuts down to the correct tension.

An interesting departure from average practice in locating for machining operations also is found in the line. The principle followed is to locate all machining operations from the part to which they are most closely related. For instance, it being essential that cylinder bores be at right angles to the crankshaft, locating for boring and reaming is done (39) from the crankshaft main bearing holes after assembly of the caps. Again, since the oil pump shaft is driven from the camshaft, drilling, boring and reaming of the hold carrying this shaft (30) is done while locating from the camshaft bearing holes.

The layout of this line of course involved considerable study of time charts of the various machine tools, in order to avoid the possibility of bottle necks that would tie up production, especially at peak demand. The line is laid out for an estimated production of 256 cars per day. Of course, there are certain operations in which a single machine tool gives more rapid production than can be taken care of by the line as a whole.

In those cases, the operator generally has to perform supplementary hand operation. Thus the Greenlee two-way tapper (12) has a capacity "rating" of 540 per day. To take care of idle time, the operator also chamfers the top holes in the block with a No. 6 Little David air drill.

The frequent duplication of machine tools for maximum production demands is indicated on the diagram. One additional case might be mentioned. Finish reaming of the valve guides (44) by means of a 12-spindle tool was not justified here. Since a single spindle Snyder drill was available, the fixture built into the conveyor line was provided with a ratchet like arrangement, providing automatic location for each valve guide to be reamed, by merely advancing the block to the next tooth in the ratchet.

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ERNST & ERNST, New York, have brought out a second, revised printing of "Budget Control, What it Does and How to Do it." It has been prepared to give business executives a comprehensive knowledge of what budgets can do for them and how they may best be handled. The book contains only 36 pages, but because of the conciseness of the writing, a great deal of valuable information in regard to budgets has been presented.

# *Parts Discount* to Independent Shops Supported by *Manufacturers*

*THERE is every indication that, while a vast majority of car makers today have reversed their attitude of a few years ago as regards their dealers selling parts outside at a discount, only a few really have gone into the merchandising of their parts in an active and forceful manner. The whole matter of distribution of replacement parts by car manufacturers quite obviously still is undergoing change and modification.*

ABOUT 95 per cent of all car manufacturers today either urge or permit their dealers to give a discount on repair parts to independent repair shops and to competing dealers.

Only two makers—Ford and Elcar—out of 28 who replied to a questionnaire from *Automotive Industries* on the subject, are not in accord with the allowing of such discounts by their dealers. The factories whose policies are detailed as a result of this survey accounted for more than 90 per cent of the total output of the industry last year. The only car companies from which information was not received were Buick, Chandler, Cunningham, Davis, Moon, Gardner, Lincoln, Kissel, Roamer and Stutz.

That the allowing of parts discounts to independent repair shops and to competing dealers has become quite common practice in the industry has been generally recognized, of course, for several years. To obtain more precise data on the status of the practice was the purpose of the survey.

While practically all factories are in accord with the idea of their retailers allowing discounts, there is a marked variation in attitude and feeling on the subject in different instances. Certain factories, for example, insist that such discounts be allowed; others are favorable but are willing to let the individual dealer do as he pleases; a few are quite indifferent, simply refraining from putting any barriers in the way of the dealer who might want to make such allowances.

In fourteen out of the 28 cases studied, the allowing of discounts to independent repair shops is said to be a matter of factory policy. In 12 instances, the allowance to independent shops is optional with the dealer so far as the factory is concerned; and, as noted above, in two instances the factory is opposed to discount allowing.

Factories, as might be expected, are less insistent on the allowing of a discount on parts to competing dealers. In only ten cases do the factories strongly urge dealers to give a discount to competing dealers. In other words, four factories whose policy it is to have their dealers give discounts to independent shops, leave the option with the dealer as regards competing dealers. In the case of Dodge and Graham-Paige, the reports indicate, discount to a competing dealer depends on whether or not that competing dealer allows discount in return.

Ford, while not allowing any discount to independent repair shops nor to competing dealers on Model A parts, still does allow 15 per cent discount on Model T parts.

The discounts listed range all the way from 10 to 30 per cent. Most of them in the lower priced lines are in the neighborhood of 15 per cent, while the average in the middle and higher-priced group is around 25.

In several instances, discount is dependent upon some investigation of the independent shop and determination as to whether in the judgment of the factory that shop meets certain arbitrary quality requirements. The usual practice, however, is to provide the dealer with enough margin so that he can profitably sell to any independent shop at a discount and then permit him to sell broadcast if he so desires.

There is every indication that, while a vast majority of car makers today have reversed their attitude of a few years ago as regards their dealers selling outside at a discount, only a few really have gone into the merchandising of their parts in an active and forceful manner. The whole matter of distribution of replacement parts by car manufacturers quite obviously is still undergoing change and modification. With the psychological attitude of manufacturers toward the problem somewhat in a state of flux, further revisions in details of current practice are to be expected. Generally speaking, however, the trend is toward more vigorous merchandising of parts by car manufacturers.

## The Rubber Industries

A WORK giving general information concerning the rubber industries was issued recently by Gauthier-Villars et Cie, Paris, as No. 185 of its popular industrial series. The book is entitled "Les Industries du Caoutchouc; Production, Culture," and was written by H. de Graffigny. It is an informative and readable little volume, not for the rubber specialist but for the "man in the street" who wants general information concerning the rubber industry. The opening chapter, entitled "The Rubber Problem," deals chiefly with the situation in the rubber market which resulted from the putting into effect of the Stevenson Act. It is followed by chapters on the history of rubber, rubber plants and their cultivation, the treatment of crude rubber, vulcanization, rubber chemistry, values of different grades, rubber substitutes and artificial rubber.

# LeBlond Sixty *Aircraft* Engine

***Powerplant has five cylinders with a bore of 4⅛ in. and a stroke of 3¾ in., giving a total piston displacement of 250.58 cu. in. The aggregate weight without fuel is 222 lb.***

A NEW engine of the LeBlond Aircraft Engine Corp., Cincinnati, Ohio, the LeBlond Sixty, recently passed the official 50-hour test at the Aero Engine Laboratory of the Naval Aircraft Factory in Philadelphia, and as a result the Department of Commerce has issued to the LeBlond company "Approved-Type Certificate No. 12," the approved rating being 65 hp. at 1950 r.p.m. The engine has been in production for some time. More than 50 were delivered to plane builders during the latter part of 1928.

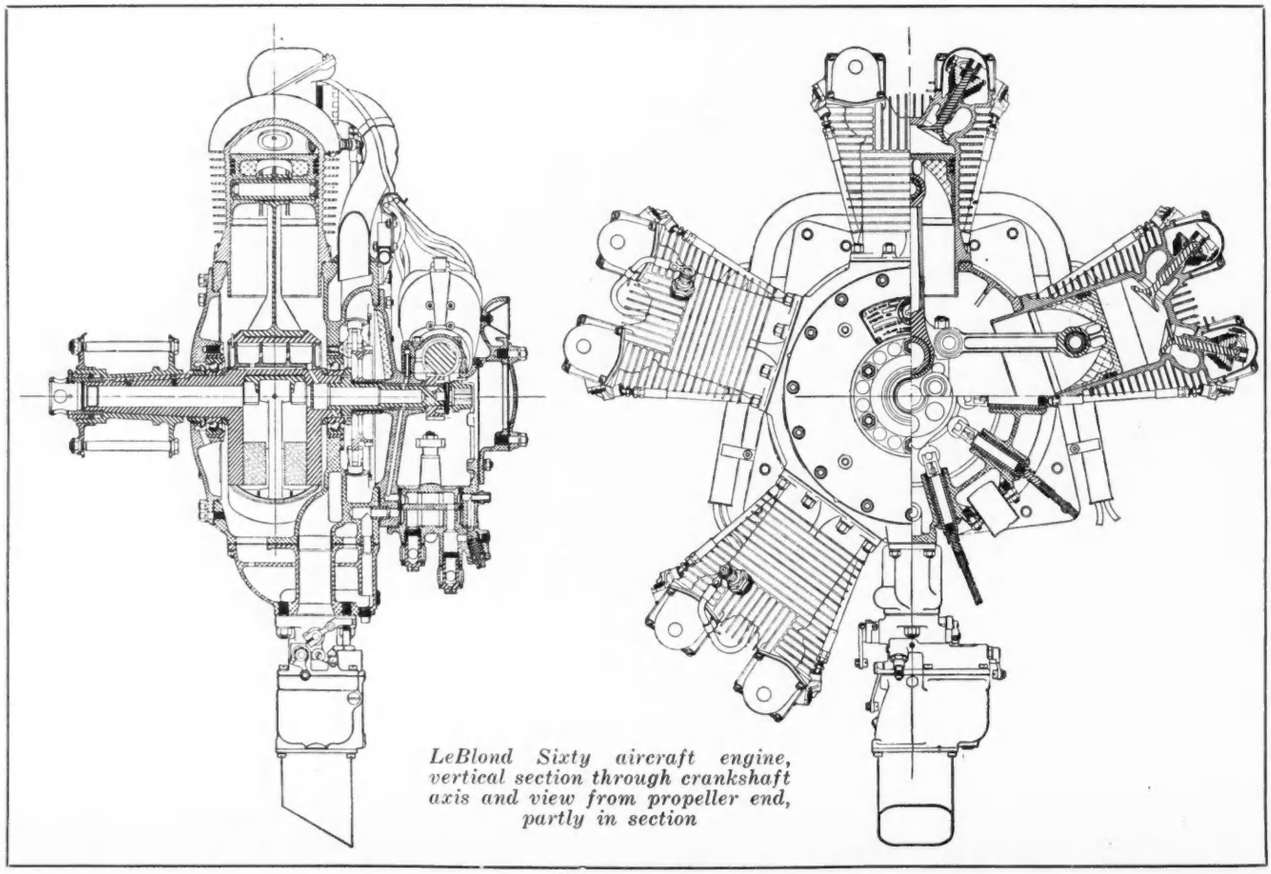
As compared with other designs of its type, the engine is said to be composed of an unusually small number of parts, and the design is such as to permit of the parts being made up into sub-assemblies, which can be inspected before being assembled into a complete engine.

There are five cylinders, each with a bore of 4⅛ in. and a stroke of 3¾ in., giving a total piston displacement of 250.58 cu. in. The compression ratio is 5.42 to 1. The reason for the short stroke is that this results in a smaller overall diameter of the engine, which lowers head resistance and increases visibility. The overall diameter is only 32¾ in., while the overall length is 22¼ in. The weight of the engine complete, dry, is 222 lb., while the mounting ring weighs 5 lb., the carburetor air heater 3½ lb. and the exhaust collector approximately 6¾ lb.

The single-throw crankshaft is drop-forged in one piece from chrome-nickel steel. It is finish-ground all over and counterbalanced by bronze weights which shoulder against two lugs on opposite sides of each crank-cheek. These weights are located by screws which are permanently locked.

The crankshaft is supported on two ball bearings, the one for the front being locked endwise in the crankcase cover to carry the propeller thrust. The inner race of each bearing is locked on the shaft.

For mounting the propeller hub, the crankshaft is

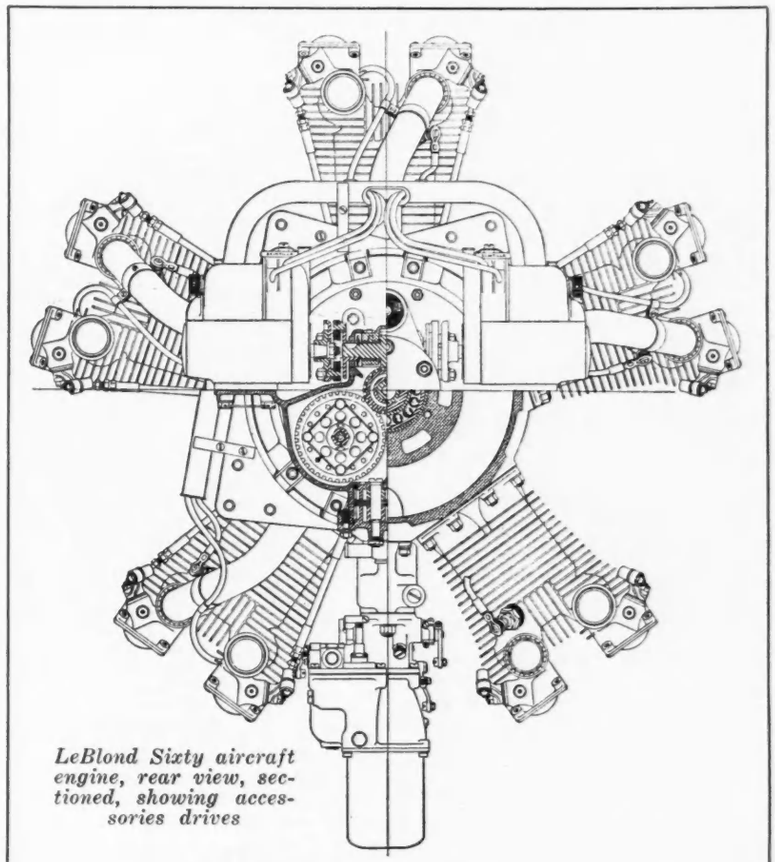


*LeBlond Sixty aircraft engine, vertical section through crankshaft axis and view from propeller end, partly in section*

# Composed of *Small Number* of Parts

provided with a tapered end in which there are a key slot and two tapped holes for the screws which retain the key. The shaft is hollow its entire length, the hole in the rear journal being made larger, and it is closed at the inner end by a Welch plug. The cam driveshaft, which forms a part of the gearcase assembly, pilots into the end of the rear journal and is driven by the lugs which fit into the slot at the end of the crankshaft. These lugs are off center so it is impossible to incorrectly assemble the crankshaft and the gearcase, once the valve timing is adjusted. Oil enters the crankshaft under pressure through the hollow cam driveshaft. It then flows to the hollow crankpin through a drill hole in the rear crank-cheek.

The crankpin is provided with three holes for feeding oil to the connecting rod bearing. The two smaller holes near the ends are so located as to register once every revolution with holes in the rod bearing that lead to the link rod wrist pins. All the oil being fed to the bearings must first pass through a special cast aluminum oil plug, which is regarded as one of the interesting features of the design. This plug is so arranged that any heavy particles of dirt in the oil, which are naturally thrown to the outside by centrifugal force, become permanently trapped and are thereby prevented from passing through the bearing.



*LeBlond Sixty aircraft engine, rear view, sectioned, showing accessories drives*

The aluminum alloy piston is cast in permanent molds and heat-treated to the desired hardness. It has a full skirt and three rings above the piston pin, the lower ring functioning as an oil scraper. The head of the piston is of ample thickness and is supplied with ribs in addition.

The piston pin is hollow, the outer surface being case-hardened and lapped. In each end is pressed a duralumin plug to prevent the pin from scoring the cylinder walls.

Articulated type connecting rods are employed. The rods are made of chrome-nickel steel drop-forgings. The shanks are not finished and it is claimed that leaving the skin of the drop-forging on results in a considerable increase in strength.

The master connecting rod and cap have a full bearing on the crankpin. The babbitt is applied directly to the steel. The cap is closely fitted to the master rod with a stepped joint and is held in place by four nickel steel bolts. These bolts also securely lock the wrist pins in place, thus eliminating numerous small parts.

The link rods are interchangeable, and the bronze bushings which are pressed into each end of the link rod and into the upper end of the master rod, are alike.

The wrist pins are hollow and the ends are closed by Welch plugs that are permanently secured by peening. The half-round slots in the wrist pins fit fairly close around the bolts, the undercut steps in the bolt being used in conjunction with drilled holes which line up with holes in the master rod and cap to supply oil under pressure to the interior of the hollow wrist pins. Midway on the wrist pin is a hole which leads oil to the link rod bushing.

The crankcase is a heat-treated aluminum casting of high tensile strength. It has a large opening in front through which the crankshaft and connecting rods may be inserted as an assembly. This opening also serves as a pilot for the crankcase cover, the latter being held in place by 15 studs. A similar opening with 10 studs at the rear is the provision for attaching the gear case assembly, and the hollow dowel through which the oil passes to the scavenging pump serves as a locater.

The integral inlet manifold is a separately cored annular passage with openings to receive the inlet pipes and one which connects with the carburetor through the crankcase oil sump. Hence, there are few joints which might possibly develop leaks, and the oil is cooled by the incoming gases.

The wall central with this inlet manifold provides a support for the rear crankshaft bearing. The ball bearing is supported directly on a steel sleeve which is

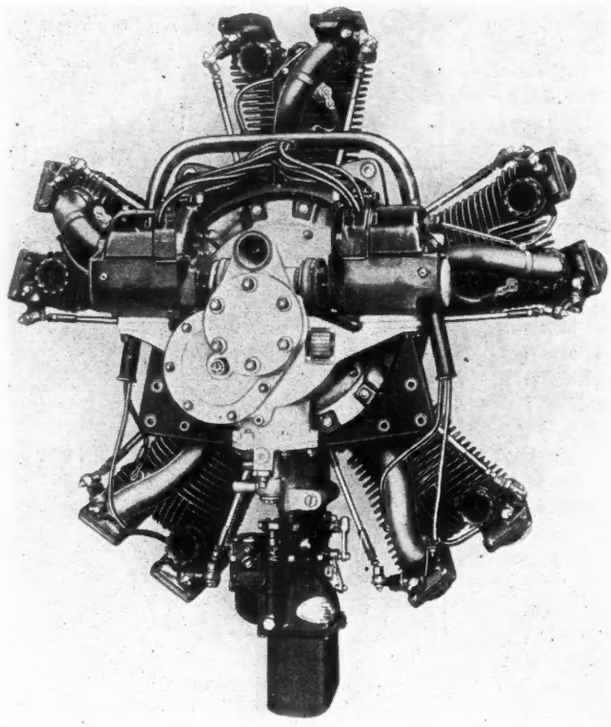
pressed into the crankcase and held in place by three countersunk head screws permanently locked from turning.

Cast-iron bushings are pressed into the crankcase to serve as guides for the cam followers, which are made from an alloy steel, heat-treated, and drilled for lightness. At the outer ends they receive a push rod ball socket which is pressed into place. A special lock screw serves to keep the follower from turning about its axis and prevent any possibility of its dropping out when the push rods are not in place. At the inner end of the cam follower is a slot to guide the hardened roller and a half-round bearing for its two small journals.

Secured to the bottom of the crankcase is an oil sump into which excess oil drains from both front and rear of the case. From the sump, the oil is drawn through a hollow dowel which locates the sump, on its return to the scavenging pump.

The opening at the front of the crankcase is closed by a forged duralumin cover which pilots into the crankcase and is held in place by fifteen studs.

The front crankshaft ball bearing is supported by the cover in a steel sleeve that is held in place by three countersunk head screws permanently locked from turning. This bearing is held endwise on the outer ball race to locate the crankshaft and to carry the thrust load of the propeller. Between the bearing and the crankshaft nut is an oil thrower which, together with threads in the front of the crankcase cover, prevents oil seepage to the outside.



*Photograph of rear of LeBlond Sixty engine*

The cylinders are cast of nickel iron in single units with cooling fins integral. Each cylinder is held to the crankcase by eight studs which pass through the hold-down flange. The inner end of the cylinder barrel extends into the crankcase to prevent over-oiling of the lower cylinders.

The outer surface is finished with a glossy black stove enamel capable of resisting heat. The inside and also the outer portion of the cylinder barrel below the flange is finished all over. The bore is finished by honing. The combustion chamber is spherical in shape and provides seats for the interchangeable inlet and exhaust valves which are inclined at an angle of 30 deg. to the cylinder axis.

The valves are silchrome steel with 45 deg. seats. Removable valve guides are pressed into the cylinder. The interchangeable valve springs are of the volute ribbon type and exert a pressure of about 60 lb. when the valve is open. Each valve is held by a split retainer seating with a taper in the valve spring collar, and a wire safety clip circles the valve stem below the collar to prevent the valve from dropping into the cylinder.

There are two spark plugs for each cylinder. Threaded sleeves are screwed into each port and protrude sufficiently to receive an annular packing nut. The inlet pipe need not be disturbed while removing a cylinder. The valve rockers are pressed on to the squared ends of the rocker shafts which are supported in bronze bushings pressed into the cylinder. Lubrication of these bushings as well as the enclosed valve parts is accomplished through a fitting from the outside.

The gearcase is an aluminum casting, piloted into the crankcase. In the central wall are two bosses, each receiving bronze shoulder bushings pressed in from the ends. On top is a pad for supporting the magneto driveshaft housing, and in line with it at each side is a bracket for supporting a magneto. Below is a flange for attaching the oil pump, the cylindrical opening in the case serving as the outer housing for the oil pump when the latter is in place.

The central boss supports the cam driveshaft. Oil enters the interior of this shaft through a hole which is in line with the space between the ends of the bushings, and it passes directly through into the end of the crankshaft. The cam is provided with a bronze bushing since it floats on the camshaft. The cam ring operates all valves and when the gearcase is in place these cams are in line with the cam follower rollers.

At the rear end of the cam driveshaft is a helical gear driven through a key. The nut which holds the gear up against a shoulder on the shaft is furnished with a female splined end to receive a starter. This helical gear drives at half engine speed another helical gear which pilots on the hub of the cam timing flange. The latter is keyed to the idler shaft and driven by four screws which set the valve timing through the selection of a differential series of holes in the two pieces. At the opposite end of the idler shaft is a gear meshing with the gear which is an integral part of the cam. The idler shaft bushings are lubricated by a pressure line in communication with the annular space between the cam driveshaft bushings.

Above and at right angles to the cam driveshaft lies the magneto driveshaft. The cast aluminum cover which closes the opening at the rear of the gearcase is located by two dowels and held in place by eight studs. In addition to the three long studs in the gearcase, three other studs are fixed in the cover to permit either the mounting of an electric starter or the cover which closes the opening central with the crank axis.

# *Just Among Ourselves*

### January Still "New Model" Month

NEW model announcements have been spread out through nearly every month of the year for the last few years. In our 1929 Statistical Issue appeared the first detailed analysis of the number of models announced each month that we know of. It is interesting to note that, despite the fact that a majority of announcements do not center in any one month, January still leads the list. About one-third of all the new models announced in 1928 came out in the first month of the year. About fifty per cent made their appearance during the first quarter. In only one month was there a complete lack of new model announcements—that was in May. The months listed in order of number of new model announcements in 1928 would read like this: January, September, July, December, August, March, April, February, June, November, October, May. We are planning to keep this record from year to year and may even develop enough energy to go back a few years and see if any definite trend can be evolved from the figures

* * *

### Pragmatism Has Built Big Industries

THE modern business man seethes, worries, argues and fights very little about mere ideas. The pressure for practical results in every department of modern industry such as our automotive industry is so constant as well as so intense that sheer nervous exhaustion, if nothing else, tends to make most of us take a ho-hum attitude toward controversies about the abstract. Pragmatism has a strong hold in the mentality of most executives today—even in the minds of those who never heard of pragmatism as a philosophy. Usually it is the practical and material which holds the interest, arouses the ire or stimulates the mind. Ability to concentrate on these practical matters very largely and to exclude from emotional as well as mental attention controversial abstractions unquestionably has been a most important factor in the building of great companies and large industries. It is a virtue whose benefits have been great.

* * *

### Is "All Things to All Men," Possible?

THIS is not to say that the modern executive lacks appreciation of art, music, drama, literature and other things extraneous to his direct business success. There can be no question about the catholicity of interests and appreciations on the part of hundreds of men high in the scale of material automotive success. But to enjoy and appreciate is one thing; to feel vividly and vitally is another. Can one live and feel intensely in all phases of life with only twenty-four hours in each day and without automatic stops and starts incorporated in his psychological makeup? This line of thought started in our mind as we read "Zola, His Life and Times," recently. A large part of the abstract ideas, literary criticism and dramatic opinions which brought Zola, his supporters and his opponents to high pitches of vituperation and emotional anguish, must seem to the modern business man of relatively little import. And yet there still is, for most of us, an inimitable pleasure in getting thoroughly wrought up and eager once in a while in discussion of some question, the solution of which can't possibly make any practical difference to anybody one way or the other. Such violently useless discussions seem worth while occasionally if for no other reason than for the objectiveness of viewpoint which tend to engender . . . . which is rather a pragmatic idea after all . . . .

* * *

### A. A. A. Flag Code Change Desirable

VAL HARESNAPE, A.A.A. Contest Board chairman, is proposing a new flag code for use in A.A.A. races. The new code would make a green flag mean start or go, which, with other changes suggested, would bring the code into conformity with current general practice and understanding as regards the meaning of certain colors. Under the present A.A.A. flag code, red means "The course is clear." Since red is generally used as a stop or danger signal, the present code does seem incongruous, as Haresnape states in a note which accompanies a request for a mail vote which he has sent to the personnel of the contest board, state representatives, speedway managers, championship drivers and press representatives. We're for the new code and hope it wins in the mail vote by an overwhelming majority. Paul Dumas, chairman of the A.A.A. technical committee for the northeast section, we find, is strongly in favor of the proposed revisions.

—N.G.S.

# *Sport Coupes* Become Popular Models *in England*

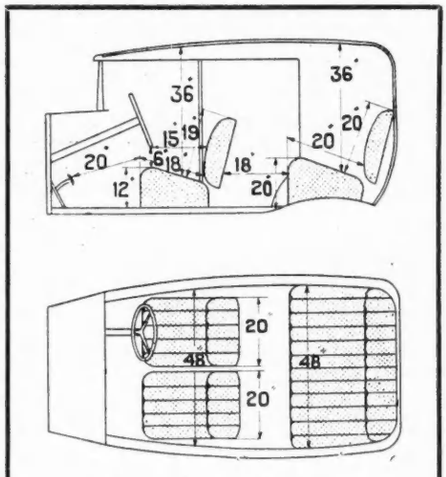
***Their acceptance now is second only to sedans in that country. Rover has been the most successful in introducing that body type, which has acquired several names.***

*By* M. W. Bourdon

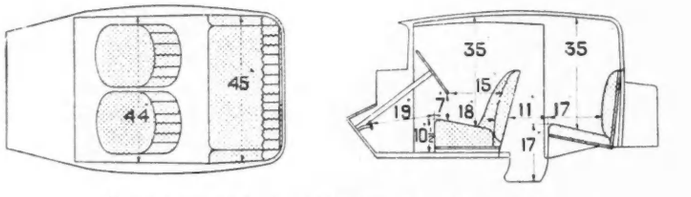
THE outstanding feature of the current demand for new cars in England is the positive leap into popularity that has been made by the so-called sports or sportsman's coupe. Where it is available, it is now second only to the sedan in popular favor. As a standard type, it was first heard of in the early summer of last year, when Major H. O. D. Segrave took delivery of a Hillman Fourteen with a body resembling a coupe with two tip-up seats enclosed within the main compartment behind the main seats instead of outside in the form of a dickey. Hillman's standardized it, terming it the Segrave model.

Meanwhile, Rover had been preparing a similar type of body, but with a fixed rear seat of full width, though somewhat narrower, front to back, than the rear seat of a sedan and brought nearer to the front seats, with legroom afforded by footwells, alongside a tunnel for the propeller shaft. Rover termed this the sportsman's coupe. It was introduced as the 122 cu. in. Six in July and at once gained popular approval, being to no small extent responsible for the fact that the output of Rover Sixes was trebled by the end of the year. At Olympia, one or two other makers introduced a similar type of body, and since then still others have followed. Now that style of body is offered by Rover, Hillman, Talbot, Crossley, Wolseley, Lagonda, A. C., Lea-Francis, Humber, Alvis and Singer, while for Riley and Austin similar types have been standardized by prominent body builders, who also provide them for certain imported chassis —Chrysler and Lancia, for instance—in the same way. Custom body-builders are experiencing a big demand for sport bodies, too, for almost every make of chassis.

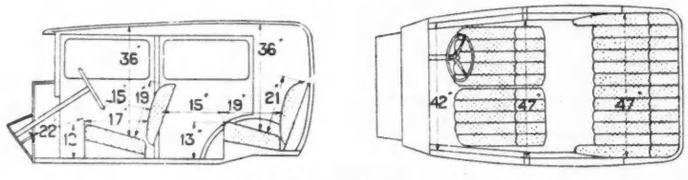
Not always is it termed a sports or sportsman's coupe. A. C. calls it the "close - coupled sedan" and Talbot the "sunshine coupe," the roof of the latter, as in certain other cases, having a sliding front section.




*Sedan body for Rover Six*




*Sports coupe body of Rover Ten (four-cylinder)*



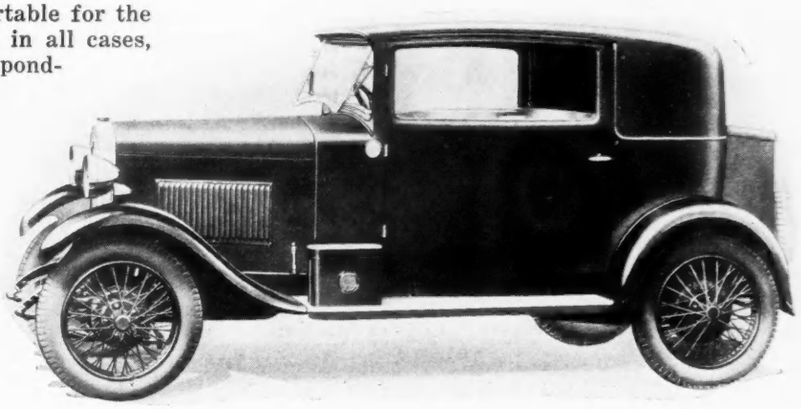

*Sedan for same chassis*

There is no question as to Rover having been mainly responsible for the rapid increase in popularity of this body type. Hillman did not merchandise it so successfully as Rover, although slightly earlier in the field, probably because the original "Segrave" model Hillman had rather attenuated rear seats, whereas the Rover from the first was not much below the standard of a sedan in rear seat comfort. At the present time, there is no uniformity in this respect among the examples standardized by motor manufacturers, unless it be that one and all are more or less inferior to the orthodox sedan. Neverthe-

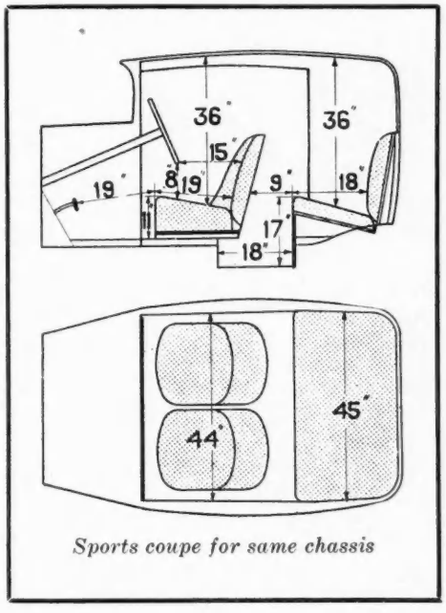
less, the majority are moderately comfortable for the rear seat passengers. The front seats, in all cases, are equal to those of a sedan of corresponding size and price.

At present, this type of body, when standardized, with two exceptions, is confined to cars of medium size and price. The exceptions are the 10 hp. Rover (72 cu. in., four-cylinder) and the 8 hp. Singer (50 cu. in., four-cylinder). The smaller Rover seems destined to attain popularity equal to that of the corresponding type on the 122 cu. in. Six.

The relative dimensions of the Rover sportsman's coupes and sedans can be gathered from the accompanying dimensioned diagrams of the two types for both the six-cylinder and the four-cylinder chassis. It may be added that the door widths are 40 in. in both cases, and are large enough to allow the rear seat to be gained without moving the front seat. But in certain types it is necessary (because of somewhat narrower doors or different arrangement of the seats) to tip up the front seat adjacent to the door that is being utilized.



*Sports coupe on 10 hp. Rover. The rear locker is integral with the fabric body*

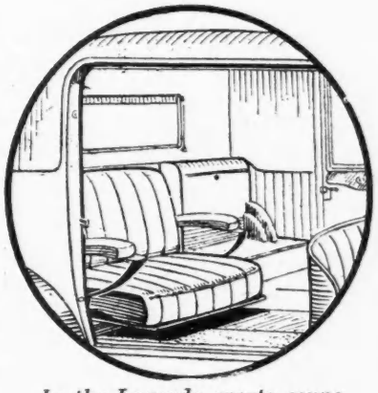



*Sports coupe for same chassis*

With all makes, these bodies are of the fabric type. The Rover, Talbot and certain others are of the genuine Weymann conception. In all except two cases (A. C. and Lagonda), the only side windows are those in the doors. The rear seat is generally within the wheelbase, the rear panel being but little, if at all, behind the rear axle. A luggage container is invariably provided at the back, although it may be either integral or detachable. On the Rovers, for instance, it is integral on the small Four and separate on the Six, although designed to accord with and fit close up to the rear panel of the body and to be quickly demountable by the release of special fasteners. When the locker is integral, it has an outside lid and often is accessible from within the body as well.

There are two opinions in regard to the rear seats. Some people favor the tip-up variety because, when they are folded, there is additional floor area available for carrying luggage, golf clubs, guns, etc.; it is even possible to take dogs to a shoot without harming the body interior. On the other hand, only one or two of these folding seats are as comfortable as the fixed examples.

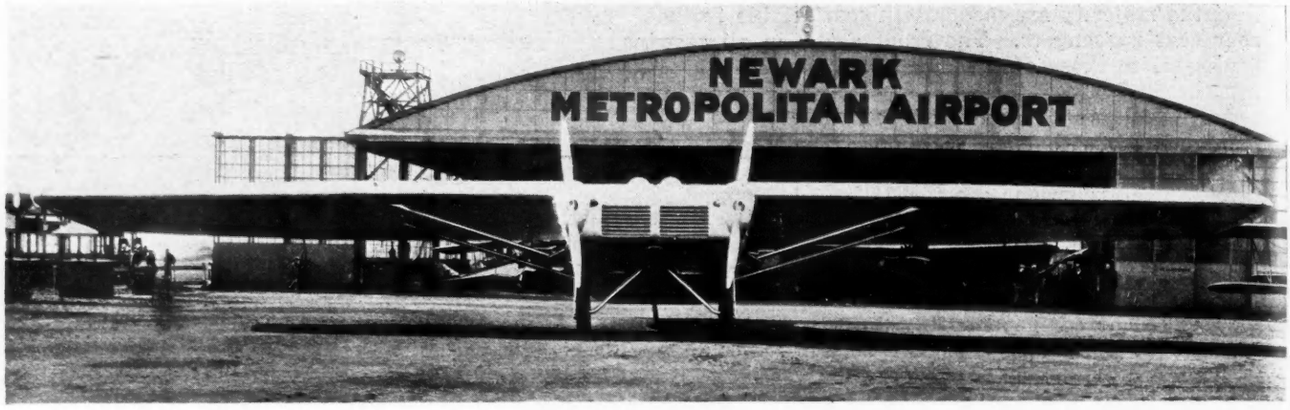
So far, only one drawback has been found to the extremely wide doors, viz., the fact that they call for more garage width to permit them, or even one of them, to be opened sufficiently to give free entrance to and exit from the seating when the car is housed. No trouble has been experienced with the hinges, for, being of light construction with the fabric panels, the wide doors do not stress the hinges to any greater extent than the narrower doors of a metal body, while the latches are designed to carry the overhanging weight of the doors when they are closed. The unusual width and weight of the windows is a drawback in traffic, however. They naturally are heavier to wind up and down in a hurry when a driving signal is to be made by hand; and when one of them must be kept open for such a purpose rather a large area is available for the entry of cold air. A small panel for emergency and instant use, closing automatically with the withdrawal of the driver's hand, is called for, and this provision is made on some of the custom-built bodies of this type. Distant handles for the latches of the front-hinged doors are not always fitted, as they might be inaccessible to the rear passengers. Instead, the interior handle at the rear end has a horizontal leather or woven rope attached to it secured at the front end, so that the front seat occupants can operate the latch thereby.



*In the Lagonda sports coupe the separate rear seats fold back, pushing the backrest rearward into a concealed locker, so leaving more clear space for baggage*

## Woodruff Keys

A PROPOSED American standard for Woodruff keys, keyslots and cutters has been completed by a subcommittee of the Sectional Committee on the Standardization of Shafting of the American Engineering Standards Association. This proposed American Standard is now being submitted to the Sectional Committee for approval. Criticism and suggestions are invited from qualified parties. Copies of the proposed standard can be obtained from C. B. LePage, American Society of Mechanical Engineers.




*Front view of Burnelli 20-passenger monoplane*

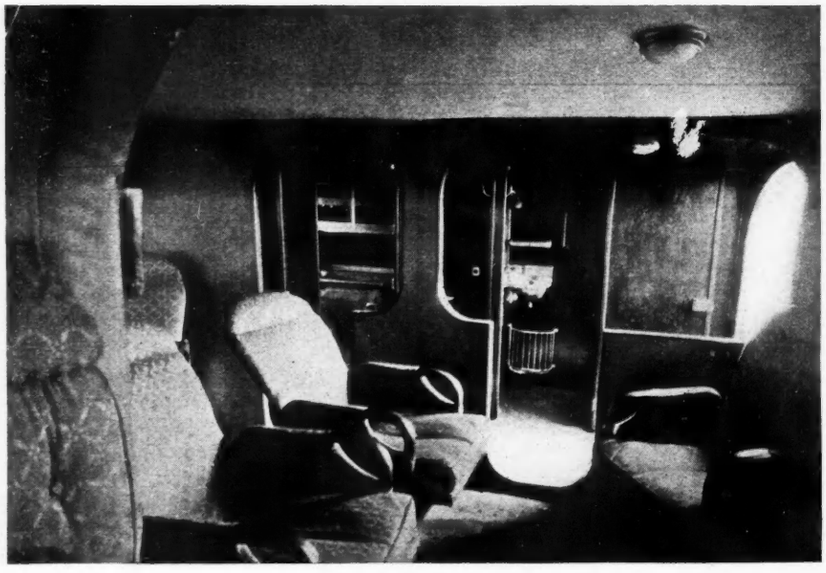
# Airfoil *Fuselage Features* New

*Giant all-metal ship will motors or both, has a re is capable of long-distance*

ONE of the largest airplanes yet built in this country is the 20-passenger monoplane recently completed by Vincent J. Burnelli, of Keyport, N. J. The plane is of the all-wing type, and is said to be the first of its kind in this country. The characteristic feature of this type is that the fuselage is an airfoil and therefore assists the wings proper in carrying the load. In the Burnelli plane, the lift of the fuselage when in flight is 4.5 lb. per sq. ft. The ship is of all-metal construction. In order to make the fuselage as effective as possible as an airfoil, it is made unusually wide, its width being 12 ft. In addition to helping sustain the load, the airfoil type of fuselage is said to have the advantage of acting as an air cushion in landing, thereby reducing the landing speed—in the case of the Burnelli about 12 per cent.

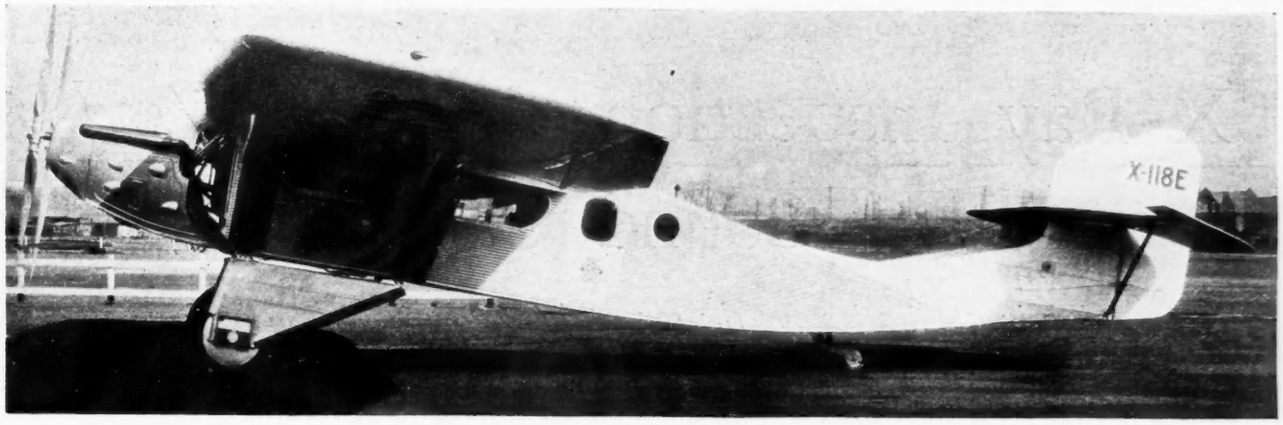
Another feature of the Burnelli plane is that the propellers are set so their axes make an angle with each other. This results in spreading the slip stream and in making it possible for the ship to be flown with one engine running without additional control. We are informed that Leigh Wade, who did the test-flying of the ship, found that it would climb on one engine with a load of 20 passengers and 1000 gal. of fuel.

The Burnelli is fitted with a retracting landing gear, the wheels folding up into the fuselage after the plane has left the ground. This is said to increase the speed by 12 m.p.h. at 150 m.p.h. The retracting gear is said to be simple and easy to operate, the operating member being a crank adjacent to the pilot's seat. The gear is "compensated," so that little effort is required to retract the wheels and return them to their regular position for landing. In addition to the position of the crank, which indicates to the pilot the position of the landing gear, a red light in front of the pilot's eyes shines as long as the wheels are retracted, hence it is impossible to make a mistake in landing.



*Interior of cabin*

The arrangement of the powerplant is somewhat out of the ordinary. The two engines are set at the corners of the fuselage, with the radiators between them. Owing to the position of the pilot's cockpit, both engines are in full view at all times and small adjustments can be made in flight. If necessary for




*Side view of Burnelli plane*

# 20-Passenger *Burnelli Monoplane*

*fly on either of its two tracting landing gear and hops. Others may be built.*

| | |
|---|---|
| Wings | 90 ft. span by 14 ft. chord |
| Fuselage | 39 ft.—47 ft. overall |
| Weight, dry | 8700 lb. |
| Useful load | 4000 lb. with 7 hr. fuel |
| Cruising speed | 115 m.p.h. |
| High speed | 150 m.p.h. |
| Fuel capacity | 1000 gal. |
| Radius with same | 2400 miles at cruising speed |
| Radius with fuel overload | 4000 miles at cruising speed |
| Passengers | 20 with 7 hr. fuel |
| Passengers | 12 with 20 hr. fuel |
| Luggage allowance | 45 lb. per passenger |
| Cabin | 18 ft. long, 11 ft. 4 in. wide, 5 ft. 6 in. high |
| Landing speed | 52 m.p.h. with full load |
| Landing light | 2,700,000 candlepower |
| Propellers | Dural, 10 ft. 11 in. |
| Engines | Two Curtis "Conqueror" 625 hp. |
| Radio Radius | 300 miles with voice |

such adjustments, one of the engines may be shut down while the plane is being flown with the other one.

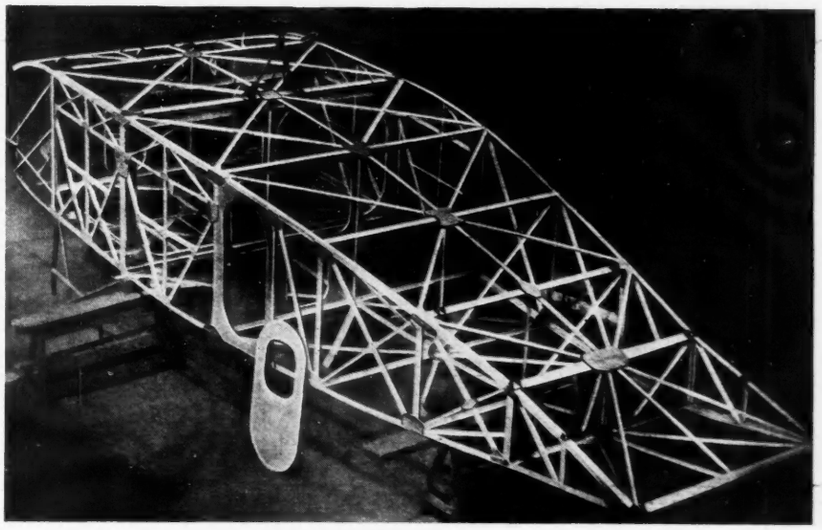
The engines are the new Curtiss Conqueror type, of 625 hp. Following are the chief dimensions and performance data of the Burnelli plane:

Fuel is carried in two wing tanks of 300 gal. capacity each and in one cabin tank of 400 gal. Additional cabin tanks have been arranged for, so that it will be possible for the plane to make flights of 4000 miles or more. It is claimed that the Burnelli plane can reach San Francisco or London from New York without stopping and carry at least 12 passengers.

The cabin equipment is complete and luxurious. The great folding chairs revolve in any direction and allow passengers to sit upright or to recline. There is a galley from which hot meals may be served and a toilet room with running water.

We understand that Mr. Burnelli is preparing six more ships of this type and is also working on a 44-passenger plane of 2400 hp., which he expects to complete by mid-summer.

The following table gives detailed specifications of the various parts of the new plane:



*Showing construction of fuselage framework*

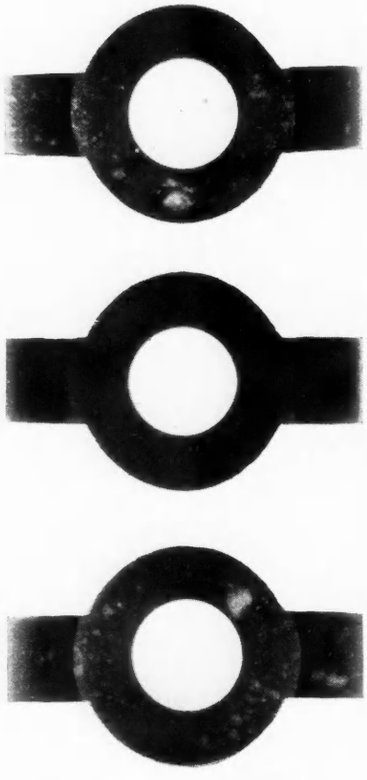
# X-Ray Inspection *May be Used to* of Sound Castings

*Their application for the controlling of foundry practice is recommended by one who believes such utilization would advance practical economy in industry.*

SOME of the advantages of using X-rays in metallurgical work, particularly in the inspection of castings, are as follows:

1. They make it possible to determine the internal soundness of castings without injury.
2. Dangerous flaws which might cause failure can be detected before the part is put in service.
3. Flaws which cause rejection after expensive machining has been done, can be located before machining is started.
4. The production of sound castings will give added strength with the possibility of smaller sections and consequent decrease in cost.
5. Gating methods can be altered so as to produce a greater percentage of good castings.
6. In castings which are difficult to pour, and flaws can not be avoided, conditions can be adjusted so as to locate the flaw where it will do the least damage.
7. They can be used to show the soundness of castings produced by various casting methods—that is, die castings have showed characteristic appearance as compared with sand or permanent mold castings.

A truly economical use of X-rays is for controlling foundry practice. By a careful analysis of representative samples, all the various phases of foundry procedure can be checked and such alterations made as will insure the production of sound castings. Often castings which have an excellent outward appearance are worth only their weight as scrap. Experience indicates that some of the general rules for foundry procedure do not hold in all cases, and attempts to explain failures without the aid of X-rays are only guesses at best.



*Comparison of die-casting and permanent mold methods of producing piston pin retainers. Center radiograph shows permanent mold product with die-castings on either side*

The importance of X-rays in metallurgy is not generally appreciated. Their use in surgery and medicine has long been known and appraised at its true worth, but very few people know that they can also be used for the examination of objects fabricated from metal, clay, cloth and other materials. They are useful to the metallurgist in two distinct ways, the first of which may be classified as the applications of radiography, the second as X-rays spectrometry. In the first instance, the metal is exposed to the action of X-rays, and shadowgraphs produced on a photographic plate. The second and far more complicated application is based on the fact that the atoms of metals are arranged in definite space locations, and are capable of reflecting X-ray spectra produced. Not only can the internal atomic arrangement be determined, but the atomic distances can also be measured. The spacing of the atoms is referred to as a space lattice, and metal has a characteristic arrangement.

X-rays were discovered in 1895 by W. C. Roentgen. He was passing an electric discharge through a highly evacuated tube, to study the ultraviolet light produced, and found that crystals of platinum-barium cyanide continued to fluoresce, when the tube was completely covered with opaque paper. It was obvious that some unknown type of radiation was sent out by this discharge tube, and Roentgen called this unknown ray "X-ray." They are also called "Roentgen" rays in honor of their discoverer, and the science of using them is sometimes referred to as Roentgenology. The greatest advance in the use of X-rays has been made during the last ten years, and the scope of their usefulness constantly is being increased.

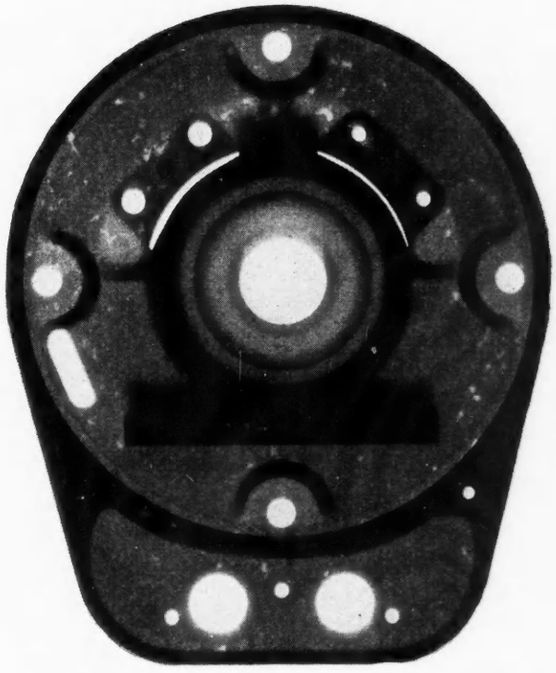
Any discussion of the physics of X-rays is intolerably technical and excessively mathematical. An X-ray tube is essentially a thin-walled glass bulb, highly evacuated, and into which have been sealed two electrodes. When a source of high voltage is connected with the terminals of these electrodes, particles of matter fly off at right angles to the surface of the electrode to which the negative wire is attached. This electrode is called the cathode, and the particles, cathode rays or electrons. If the cathode surface is concave in shape, the electrons will be focused at the center of the curvature. If the other electrode be placed at this center of curvature

# Insure *Production*

*By* GREGOR S. AFFLECK
*Metallurgist and Director of Research, Aluminum Industries, Inc., Cincinnati, Ohio*

it will serve as a target, and will emit X-rays, and when a sufficient number of electrons strike this target, a continuous stream of X-rays will be emitted. X-rays are not particles of matter, but are merely another form of light, which penetrates objects opaque to ordinary light.

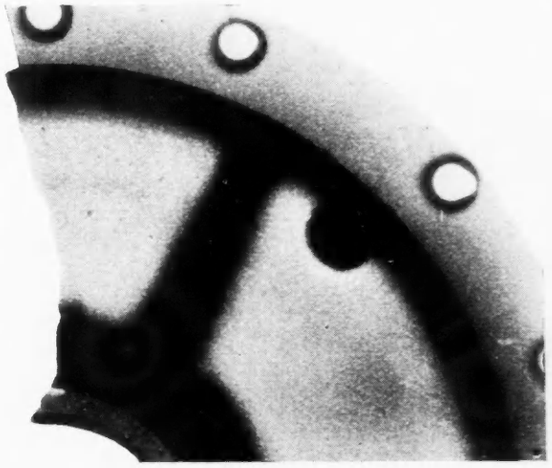
The penetrating power of X-rays increases as the speed of the cathode particles striking the target increases, and the speed of these cathode particles is dependent on the increase in the applied voltage, or the decrease in the amount of gas in the tube. The quantity of X-rays depends upon the quantity of cathode particles, which in turn depend upon the quantity of



*Radiograph of Magnesium Alloy "Electron" die-casting, produced in Germany, showing internal cavities and numerous "cold shuts." This casting has a quite excellent exterior*

electricity. That is, the quantity and quality of X-rays is dependent on the current and voltage applied. The voltage is expressed in kilovolts, or by measuring the gap which an electric spark will jump to short circuit the X-ray tube, approximately 20,000 volts will jump a gap of one inch. The current is measured in units named milliamperes, which are one thousandth of an ampere, by an instrument named milliameter wired in the circuit. It is well to check the voltage by measuring the actual spark gap.

The intensity of X-rays varies inversely as the square of the distance between the film surface and the target. Unfortunately, the photographic effect does not vary



*Radiograph showing section of an excellent permanent mold casting*

directly with the spark gap. This photographic variation is dependent upon the protographic materials used, and is determined by the manufacturer of these materials.

Besides producing a photographic effect, X-rays also ionize gases and produce fluorescence in certain salts. They are diffusely scattered by all substances, and are partially absorbed by matter of all kinds. This absorption is much greater in the case of elements of high, than by elements of low, atomic weight. Therefore, materials such as aluminum and magnesium are more easily penetrated than iron and zinc. The examination of castings by the fluorescence of salts exposed to X-rays is not so sensitive as the photographic method. However a combination of the two is used where exceptionally thick sections are to be examined, or where the material is of high atomic weight. This is done by placing the photographic film on one, or between two fluoroscopic or intensifying screens. These intensifying screens are mounted in pairs in rigid holders called cassettes and increase the effective exposure about 800 per cent.

X-ray photographs, or radiographs, are merely shadow pictures, and the image produced on this film is actual size. The actual production of a radiograph consists in exposing a photographic plate, or film to the X-radiation passing through the part to be examined, and then treating with suitable developing and fixing solutions. The apparatus required for examining the light alloys used in aircraft construction is exactly the same as that used by surgeons. Heavier metals and alloys require higher voltage equipment where the sections are excessively thick.

It is quite useless to examine castings or other fabricated parts only to find the internal defects. X-ray photographic materials are somewhat more expensive than the ordinary type, and the added cost of equipment for generating X-rays makes radiographs relatively expensive. However, this cost may be far less than the expense caused by failure in use, or rejection after expensive machining operations have been completed. Where failure may result in the loss of human life, the mere cost of radiographs should be considered. Radiographic examinations of representative samples for the purpose of controlling production methods is well worth the small cost.

# Broad Thinking and Flexible

***More intelligent dreaming and wider contacts, particularly in fields where scientific development is progressing rapidly, are recommended to automotive men.***

ONE day a few weeks ago G. M. Williams, president of the Marmon Motor Car Co., publicly announced his belief that before the end of the present century automobiles would be driven by radio waves from central power plants and that the present type of vehicle would be as obsolete as the Dodo bird, the great Auk and the great Horn Spoon.

The very next day, he took as the text of his talk to a group of Marmon dealers the word "substantial," placing it as being, in his opinion, the fundamental quality essential to the engineering, production, merchandising and financial policies of a successful automobile company or dealer organization.

And to one talking with him about both subjects—feeling the forcefulness of his purpose and personality and sensing the hard practicality behind his furthest visions—much of logic and nothing of inconsistency grows out of the joint consideration of these two ideas, superficially so divergent in conception and timbre. In truth, this ability to range competently over extremely wide areas in general mental conceptions, in concrete business activities and in engineering thinking in many fields, appears as perhaps the essential characteristic of the Marmon head. It is illustrated not merely in incidental statements, such as those mentioned in the opening paragraph, but in the unusual variety and consistent success of his whole business life and in the multitude of incidents which members of his own organization will relate informally about him.

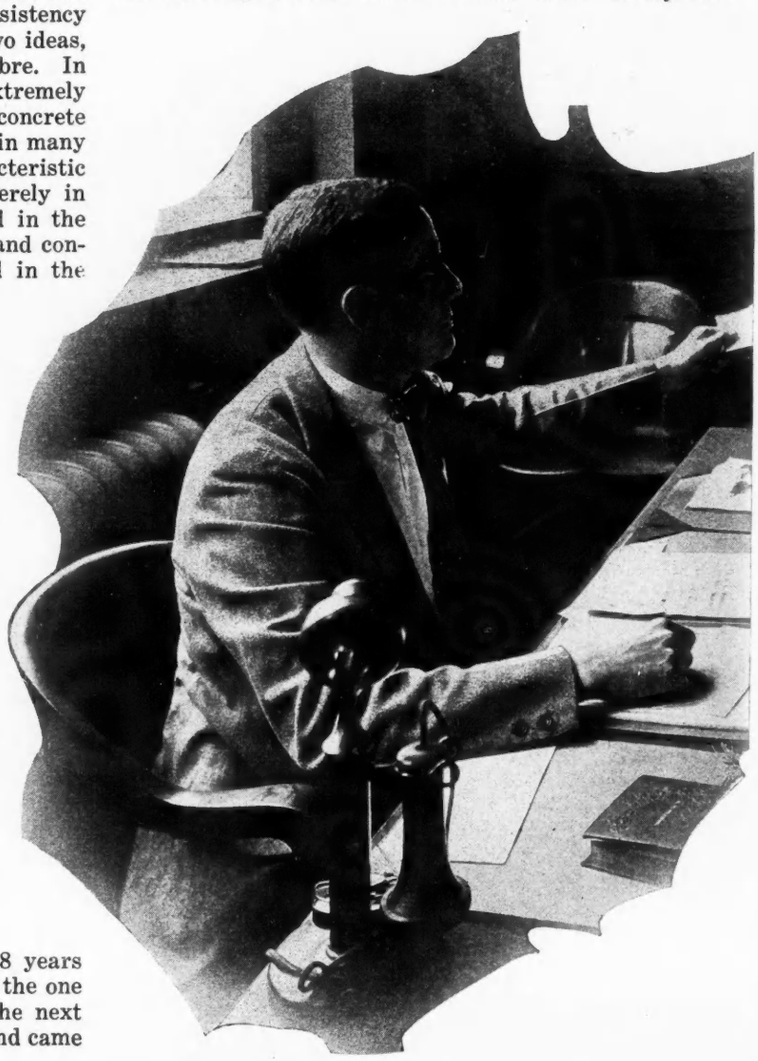
"What about these radio-driven automobiles that you predicted the other day?" we asked Mr. Williams, somewhat in that tone of skepticism engendered by the daily necessity of trying to sort out plays for publicity from honest expression of ideas. "You were quite specific in your statement," we reminded him, "when you said that: 'Automobiles of the future will be driven by electric motors and will receive their power by radio directly from centrally located transmitting stations, each car owner being assigned a specific wave length.'"

"Yes, that is just what I did say," Mr. Williams rejoined, "and I meant it. Naturally, I wasn't talking about next year or the next decade. I was talking about the distant future. Whatever various engineers and executives in the industry may think about the statement, I am frank to say that I believe it to be a perfectly safe one to make in the light of present scientific development and of past progress along electrical lines.

"Within my own lifetime [Mr. Williams is 38 years old], far greater changes have come about than the one which I am predicting will take place within the next 75 years. The first wireless transmission of sound came less than 25 years ago, and look at the relative perfection of wireless sound transmission today!

"Wireless power transmission is an accomplished fact. Power has been transmitted over short distances under laboratory conditions without wires. Infinite obstacles lie in the way of making this type of power transmission available in a practical or commercial sense, to be sure, but similar apparently insuperable obstacles appeared to obstruct the commercialization of the telephone, the telegraph and the radio when they were in the laboratory stage.

"What is of more immediate importance than the long range phases of this question, however, is the extent to which the automobile engineer of today can gain ideas and inspiration from closer contact with scientists and investigators in other technical fields. Every new



# Minds Are Industry's Needs

## *Says George M. Williams of Marmon*

*By* Norman G. Shidle

*Close-ups of George M. Williams, president of the Marmon Motor Car Co., who is in Europe on his twenty-sixth trip abroad for the purpose of introducing personally in England, France, Swizerland, Germany and the Scandinavian countries the new Roosevelt Eight. Marmon is distributing its cars in 40 foreign countries. Of its total sales in the last seven months, 16.2 per cent was accounted for in foreign markets exclusive of Canada*

scientific advance of the last twenty-five years has served to emphasize the unity of all matter—the absolute interdependence and oneness of physics, chemistry, electrical phenomena and other subjects, which, even in my school days, were wont to be treated as separate and distinct fields.

"No automobile engineer or executive today," Mr. Williams continued, "can hope to get the vision of automotive development as it might be unless he very definitely contacts and understands developments and progress as they are being achieved in other fields of engineering and science. And, incidentally, he must have a mind which is flexible enough to permit him to dream dreams occasionally. A thing must be thought of before it can be accomplished. Practical experience has shown us that for every hundred things thought of perhaps one turns out to be possible and feasible in accomplishment. Consequently, there is a vast need for vision—for thinking in somewhat radical terms, if you will, about future possibilities.

"Too many engineers and executives are afraid of being laughed at. They would rather go along forever in a respectable mediocre way than brave one sneer or one moment of ridicule from their fellow craftsmen. Yet scarcely a noteworthy achievement in history—including the achievement of the automobile itself—was ever accomplished without the man with the original vision having been laughed at by somebody in the beginning.

"I realize, of course," Mr. Williams added, "that the converse of that proposition is not at all true. Everything that is laughed at does not turn out to be a great achievement. The fact remains, however, that there is too little intelligent dreaming done on the part of the average automotive man and that our industry has much to gain from increasing its contacts with engineers, technicians and scientists in electrical, chemical and other fields where scientific development is going on rapidly."

This feeling about the desirability of broad thinking and contacts for automotive men would seem to be quite natural in Mr. Williams because of the great breadth of his own personal experience and contacts before coming into the automotive industry, and because of his subsequent phenomenal success in bringing the Marmon Company to a secure financial and engineering position in a little less than five years.

Although he had a wide experience as an executive before taking charge of Marmon in 1924, Mr. Williams was originally a civil engineer, educated at Sault Ste. Marie Technical Institute, and experienced in a great variety of practical civil engineering enterprises before assuming a managerial position.

His first job after leaving college was as a member of the Canadian Government Survey and Exploring Party near Hudson Bay. Later, he became party chief and served in that capacity for 18 months. His next move was to the Lake Superior Power Co. at Sault Ste. Marie, Mich., as assistant hydraulic engineer, and when he left there he became resident engineer at their Steep Hill Falls Power Development. He was with them from the latter part of 1909 until 1911. From then until 1915 he was assistant chief engineer of the H. E. Talbot Co., of Dayton, Ohio, on power development work. In 1915, he was made second vice-president of the Dayton Metal Products Co., which position he held until 1917, when he associated himself with the Dayton-Wright Airplane Co. as general manager. After the company was merged with the General Motors Corporation, he remained as general manager of the Dayton-Wright Division until October, 1923, when he accepted

the presidency of the Wire Wheel Corporation of America with executive headquarters at Buffalo, N. Y. He resigned that office in 1924 and associated himself with the Nordyke & Marmon Co. of Indianapolis. He is also a director of other corporations.

Mr. Williams was born at Nonaimo, British Columbia. His father is George Williams, a retired banker of Goderich, Ontario.

This wealth of experience as surveyor, explorer, construction engineer and executive makes Mr. Williams well qualified to speak of the benefits to be derived from a cosmopolitan interest and understanding of all phases of business and scientific development.

He has a definite personal as well as a business interest in the development of aviation, being a pilot and taking delight in operating his own plane. While he was general manager of the Dayton-Wright Airplane Co. that organization produced 3600 airplanes for the allied forces during the war. Thus, Marmon's current venture into the aircraft industry is under the leadership of a man peculiarly qualified to guide it aright.

His success with the Marmon company itself is too well known to need repetition to an automotive audience. When he assumed the managerial reins in May, 1924, the company, despite twenty-two years of fine reputation as a builder of high grade automobiles, was not paying dividends to its stockholders.

Immediately Mr. Williams embarked on the development of a five-year program of engineering and managerial progress, which began to bear fruit within a short time. On Dec. 1, 1926, the company began payment of a regular quarterly dividend on its common stock. That dividend has been paid regularly ever since. In January, 1927, the first 8-cylinder Marmon was announced, marking the entrance of the company into the less than $2,000 price field. The 8-cylinder 78 series came out in November, 1927, and the 8-cylinder 68 series in January, 1928.

Now the Roosevelt—the first 8-cylinder automobile to sell for less than $1,000—just has been announced and production of a new high-priced 8-cylinder model before the end of the year has been promised the dealers, thus completing an engineering program laid out five years ago.

The company enters 1929 with more dealers and distributors than at any other period in its history. And the members of the Marmon factory staff, as well as of the dealer organization, are unanimous in attributing to George Montague Williams the leading role in this five years of dramatic progress.

# Effect of Exhausting Into Rarefied Atmosphere

AN increase in power output of 22 per cent was obtained by exhausting into a partial vacuum during recent laboratory tests carried out by Charles Waseige, chief engineer of the engine department of the Farman Brothers Aviation Company. It was with a view to determining the gain in power resulting from exhausting in rarefied atmosphere, when flying at high altitudes, that the laboratory tests were undertaken. A normal Farman automobile engine having six cylinders of 100 by 150 mm. bore and stroke, and the standard compression ratio of 4.5, was used. The exhaust was led into a chamber into which the pressure had been reduced to 300 mm. of mercury.

By reason of the more complete scavenging of the cylinders, the power output was increased 22 per cent, but this does not by any means represent the maximum increase possible, for owing to the absence of inert gases in the cylinders the compression ratio could be increased very considerably, thus adding still further to the power gain. Another advantage due to exhausting in a partial vacuum is that valves operate at a lower temperature and consequently are less liable to breakage.

These advantages were set forth at a meeting of the Societe Francaise de Navigation Aerienne, when Engineer Waseige emphasized the value of supercharging for both automobiles and for airplanes flying at high altitudes. Increases in power output of 90 per cent have been obtained by supercharging small European engines, with practically no increase in gasoline consumption per horsepower hour. For any required power, a supercharged automobile is cheaper to produce than a non-supercharged type, declared Waseige, for the saving in the weight of metal, as well as the saving in chassis weight by reason of the smaller and lighter engine, more than compensates for the cost of the supercharger and the more solid construction to withstand the higher stresses.

At an altitude of 20,000 ft., a supercharged engine can be made to give off four times more power than at ground level. It was indicated that the Farman Company had produced bombing planes fitted with two hp. Farman engines, having the Farman-Rateau centrifugal two-stage compressor, which developed 510 hp. at an altitude of 16,000 ft. These planes would outclimb any scout machine not fitted with a supercharged engine.

Among the problems connected with high altitude flights is the use of an automatic clutch and change speed mechanism on the supercharger. Several different types are now in use on European planes, among them being hydraulic, planetary, and planetary-magnetic systems. Variable pitch propellers are almost essential, and an air-tight cabin is necessary, but the problem of supplying the small quantity of air necessary for a human being is slight compared to the supply of air necessary for an engine.

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# Stewart Trucks Improved

A NUMBER of refinements have been made in the truck line of the Stewart Motor Corp. of Buffalo, mainly in respect to appearance and comfort. Nickel-plated, shell-type radiators are now used on all models from ¾ to 1½ ton. The radiators, moreover, are higher and narrower, and a splash apron is provided at the front of the radiator.

Front fenders are now full crowned on all models up to the six-cylinder four-ton. The hoods are wider and have a nickel-plated band at the rear, adjacent to the cowl. Running boards are of the narrow-grooved type and edged with aluminum, and aprons are used with the running boards. All of the toe boards and foot boards also are of the narrow-grooved type. Walnut instrument boards are used on models up to the 18-X.

# Impact-Toughness of 3130 Steel Determined by Tests

***Torsional properties also investigated. 1500-1525 deg. is found suitable temperature range for quenching.***

WHEREAS the tensile properties of all the more widely used construction steels are well known and are recorded in publications of the S.A.E. the A.S.M.E. and the A.S.T.M., there is much less information regarding impact-toughness and torsional properties of such steels. To meet this deficiency in respect to medium-carbon, low-chrome nickel steel (S.A.E. steel No. 3130), the research laboratory of the International Nickel Co. carried out a series of tests on nine commercial heats of standard 3130 steel and presented the results in a bulletin of which T. H. Wickenden is the author.

To make the data as representative as possible, material was secured from three different steel companies. The sample hot-rolled bars were taken from their regular open-hearth production heats. The sizes ranged from 15/16 in. to 1¼ in. round. Samples from a total of nine different heats were tested, the average analysis being as follows: *C*, 0.037; *Mn.*, 0.598; *S*, 0.0252; *P*, 0.0215; *Cr.*, 0.605; *Ni.*, 1.226.

Small samples were taken from seven heats and quenched at temperatures varying from 1300 to 1550 deg. in order to determine the proper quenching temperature. This test showed that in most cases it required a minimum hardening temperature of 1475 deg. to produce maximum hardness, although in the case of one steel with 0.33 per cent carbon and 1.38 per cent nickel the full hardness could be developed at a temperature as low as 1425 deg. This showed that a temperature range of between 1500 and 1525 deg. would be sufficiently high for commercial treatment.

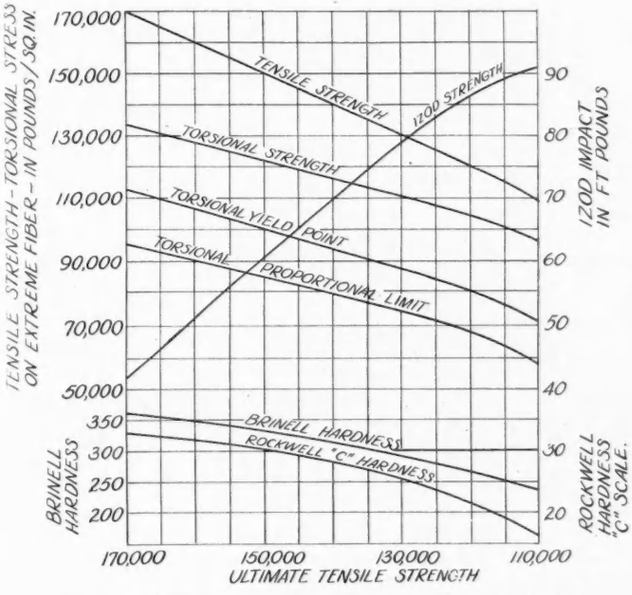



*Fig. 1—Various mechanical properties of S.A.E. No. 3130 steel, water-quenched, as related to the ultimate strength of this steel*

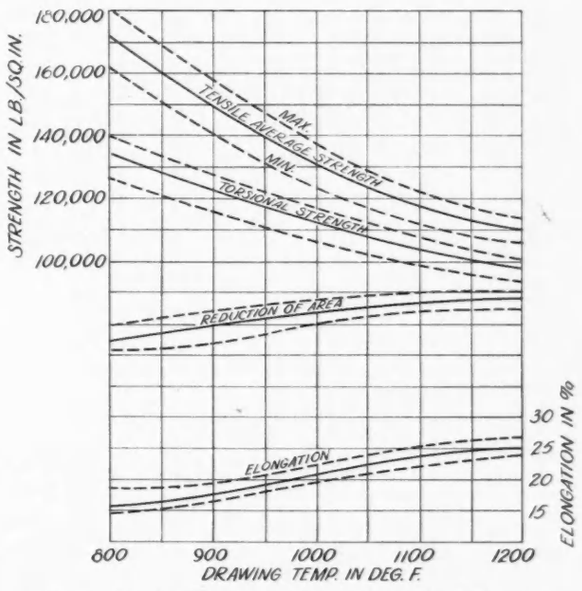



*Fig. 2—Mechanical properties of S.A.E. No. 3130 steel, water-quenched, plotted against drawing temperature*

The torsion test specimens after heat treatment were machined to 1/10 in. under the original diameter between gage lengths. The following formula was used for calculating the shearing stress:

$$\text{Stress} = \frac{16\ M}{\pi\ D^3} = \frac{5.1\ M}{D^3},$$

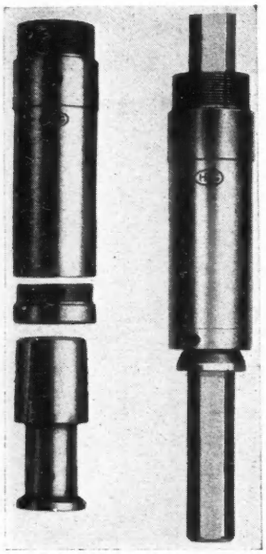
in which $M$ is the torque in lb.-in. and $D$ is the diameter. Although this formula holds true only up to the elastic limit of the outer fiber, it is commonly used for figuring the ultimate shearing stress and was the method used in this work. The various values secured for each property were averaged and plotted as curves in Fig. 1.

Graphs are presented in Fig. 1 showing the torsional properties and their relation to Izod impact, Rockwell and Brinell hardness values. Fig 2 shows the average maximum and minimum tensile values plotted against drawing temperatures. Fig. 1 is somewhat unusual in that the various mechanical properties are plotted against one of these properties, the tensile strength, rather than against the drawing temperature, as is customary. The reason for the use of this method is that it permits an easy comparison between steels of different kinds with respect to their various mechanical properties when they are drawn at temperatures to give the same ultimate strength.

# *New Developments*—Automotive

## Eastern H & G Feed Pusher

THE Eastern Machine Screw Corp., New Haven, Conn., has brought out a new type of feed pusher for multiple spindle automatic screw machines. This new machine has a positive grip and positive release; it provides uniform feed, eliminates rebound and drag marks and is said to have an extraordinarily long life. The pusher is composed of two principal parts, the master, which fits on the end of the customary feed tube, and the inner pusher, which is installed inside of the master. A taper on the inside of the master corresponding with the taper on the inner pusher causes the inner pusher to grip the stock firmly when the feed tube is pushed forward for feeding. When a machine is once equipped with a set of masters it is only necessary to change the inner pushers in order to shift operations quickly from one size of stock to another.



*Eastern H & G Feed Pusher*

## Cylinder-Sleeve Boring Machine

TRACTOR and similar engines generally are made with separate, renewable cylinder liners. For boring such liners, the Defiance Machine Works, Defiance, Ohio, has developed the four-spindle, fixed-center boring machine illustrated herewith, which it refers to as its No. 8. It is strictly a production machine and designed to meet requirements in rough, semi-finish and finish boring and in reaming. Four sleeves are worked on at a time and the production with any of the above listed operations is said to be from 50 to 100 sleeves per hour.

The frame and base castings are of heavy design, with substantial internal ribbing and with broad and long slides properly scraped and gibbed.

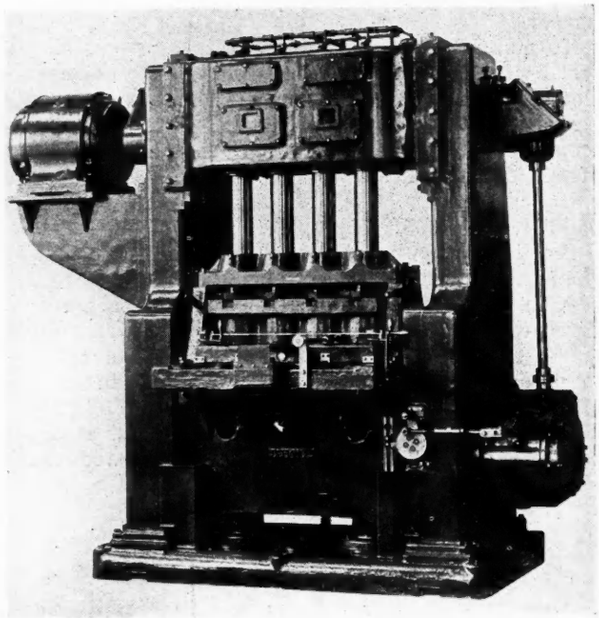
The feed mechanism, of unit construction, is easily accessible. It is completely encased and holds a supply of oil for splash lubrication. All feed shaft bearings are bronze bushed and carry SKF ball thrust bearings. Feed changes can be made by simply removing the cover of the gear case and changing two gears.

A hand adjustment for the table feed is provided, but when the machine is in operation, the table automatically feeds the work up to the boring tools at rapid traverse, and when through the cut, it automatically reverses to a fast travel, returning to its loading position and stopping until engaged to bore the next cylinder. By means of double clutches in the feed box, the machine can be set to feed, disengage, rapid travel up, feed again, disengage and automatically return.

The drive to the spindles can be transmitted by belt from a three-step cone pulley or from a motor connected with flexible coupling direct to the driveshaft.

The spindles are made of hammered alloy steel and are supported by three bronze bearings. The nose bearing is conical in shape and has a convenient means of adjustment for taking up wear. Each spindle floats between two sets of SKF bearings which receive all end thrust and reduce friction. The spindles can be quickly stopped, after the power is shut off, by means of a friction brake located close to the operator.

The boring tool is fitted to the spindle by a tapered shank and is securely held in place by a long bolt leading through the spindle from the top.



*Four-spindle cylinder-liner boring machine*

The center section of the fixture is mounted on a sliding table operated with an air cylinder for opening and closing. The cylinder is equipped with a pressure gage and an air reducing valve set at 60 lb. pressure to reduce the pressure from the main air line.

The top of the fixture is supported with a bushing plate and a hardened gib eye to pilot the boring bar before entering the cut.

A pair of jack screws which raise and lower the table are retained in jacks and are actuated by a heavy worm and worm gear through a bronze nut which is sleeved to the worm gear. Each jack is a unit in itself and the moving parts are packed in grease. A simple adjustment for advancing or retarding the screws independently is provided to maintain the alignment of the table. All thrusts are taken by SKF ball bearings.

# Parts, Accessories and Production Tools

## "Screwnail" Introduced

THE PARKER-KALON CORP., 192 Varick St., New York, has developed a new nail called the "Screwnail" designed for fastening sheet metal to wood. It is called the Screwnail because it combines the qualities of both, being driven like a nail and holding like a screw.

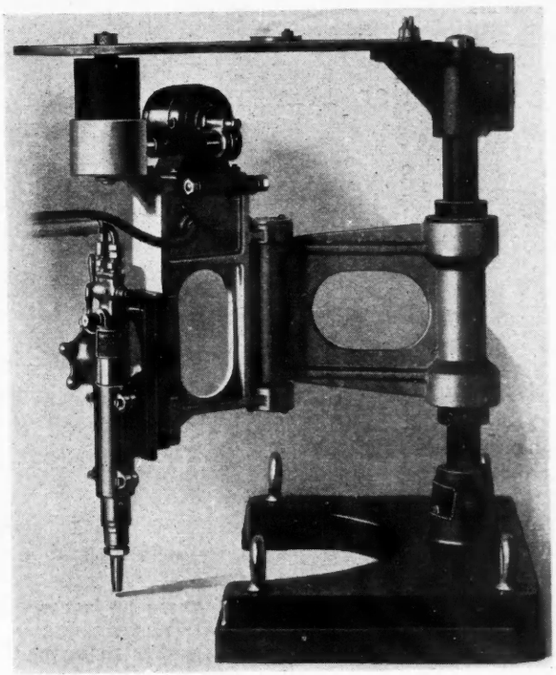
The hardened spiral thread and needle pointed pilot permit Screwnails to be driven through heavy sheet

*Parker-Kalon Screwnails*

metal, thus eliminating the necessity of punching or drilling holes. The hardened spiral thread forms a thread in the metal burr and wood, securely fastening the sheet metal to the wood. Among the uses suggested in automotive manufacture are for fastening bodies, door and roof, trim pads, upholstery, drip and running board moldings, etc.

## Airco Metal Cutting Machine

THE Air Reduction Sales Co., 342 Madison Ave., New York, has developed a new Airco-Davis-Bournonville No. 4 Camograph for use in cutting steel plates with an oxy-acetylene torch. The machine consists of a U-shaped base, in which is fixed a steel shaft to which moving parts are pivoted and which also sup-

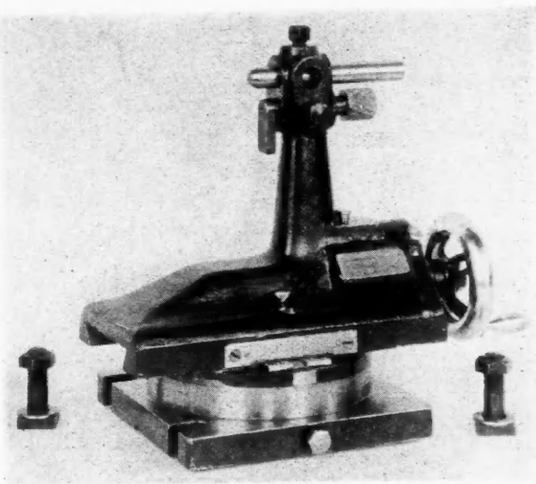


*Airco oxy-acetylene Camograph*

ports a cam holder. Two hinged aluminum arms mounted on Fafnir ball bearings, and a hand-operated vertical slide on the end of the outer arm carries a machine cutting torch, a motor, switchbox, gearing and electromagnet. Cams are machined to the shape to be cut, and with the machine in operation a roller attracted to the cam surface by a powerful magnet, rotates and traverses the cam shape, thus carrying the torch along the same path to cut the steel plate beneath its tip.

## Attachment for Surface Grinder

THE Brown & Sharpe Mfg. Co. of Providence, R. I., has announced a new radius and angular wheel truing attachment for its No. 2 surface grinding machine. The attachment is designed to provide an accurate and efficient means of shaping abrasive wheels used on the surface grinding machine. It is particularly desirable when grinding such work as lamination dies,



*Brown & Sharpe wheel truing attachment*

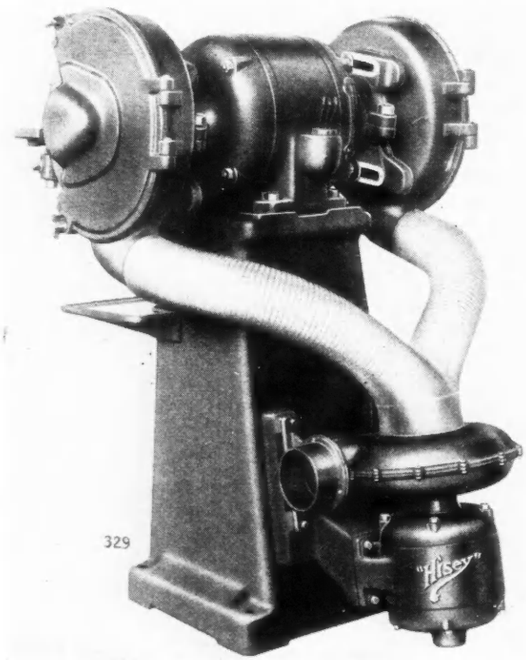
flat forming tools, and miscellaneous pieces requiring wheels having radial or angular faces. The attachment consists of a base and a slide that can be adjusted longitudinally by a hand wheel and an upright, integral with the slide, which holds the diamond tool and diamond tool setting gages.

## Kent-Owens Hand Feed Miller

A COMBINATION hand or power feed miller, which has a combination manual and power feed arrangement, the operator using either at will, has been developed by the Kent-Owens Machine Co., Toledo, Ohio. Rapid return is by hand which permits 600 to 700 in. per minute. A conveniently located star wheel is used for both manual feed and rapid traverse. The power feed is operated by a lever at the front of the machine. Adjustable trip dogs on the side of the table engage and disengage the feed. The head may be fed vertically by hand. The table is 25 in. long by 14 in. wide while the maximum distance from the spindle to the surface of the table is 17½ in. The machine may be arranged for either belt or motor drive, a 3 to 5 hp. motor being recommended.

## Hisey-Wolf Exhauster

THE Hisey-Wolf Machine Co., Cincinnati, Ohio, has developed an all-ball-bearing, motor-driven type of exhaust equipment, designed for use on Hisey grinders

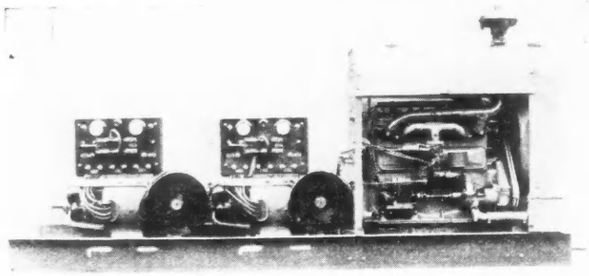



*Hisey-Wolf Exhauster equipment*

of 10, 12 and 14-in. wheel capacity, and also for Hisey buffing and polishing machines of 8, 10, 12 and 14-in. capacity. A single automatic motor starter controls both motors.

## Electric Arc Welding Machine

THE Electric Arc Cutting & Welding Co., 152 Jelliff Ave., Newark, N. J., has brought out a two-man, two-arc welding outfit motored by a Continental 40 hp.



*Electric dual arc welding machine*

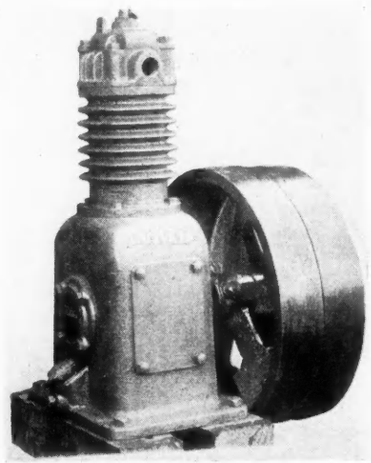
engine. Each of the generators is capable of 300 amp. metallic arc welding and they can be multiplied to obtain full capacity for carbon arc welding also.

## J. & L. Hartometer

JONES & LAMSON MACHINE CO., Springfield, Vt., have developed an operator's screw thread gage, called the Model K Hartometer. This device shows errors in lead and diameter in screws and also the progress of these errors, thus permitting the operator to make adjustments before the errors leave the boundary of the tolerance zone. A screw to be tested is turned into the gage and then by turning an arrow to the right and to the left, two zones on the gage show whether the screw is within the tolerance limit and, if not, just what the errors in it are.

## Curtis Air Compressor

THE Curtis Pneumatic Machinery Co., St. Louis, Mo., has brought out a new line of air compressors primarily intended for use in garages or service stations, but also suitable for use in industrial plants where intermittent service is required. The line includes 11 models ranging from ¼ to 5 hp. and from 150 to 200 lb. pressure. Models can be furnished either as single cylinder, single stage, two cylinder, single stage, or two stage. All types are designed for automatic or manual starting. Crankshaft main bearings are Timken tapered roller type, so mounted as to preserve the rigidity of the shaft, and to take care of any thrust loads that may arise during operation.



*Curtis single-cylinder, single-stage air-cooled compressor*

## Mueller Magnetic Probe

A MAGNETIC probe for use in removing iron and steel particles from the eyes and flesh of workmen has been developed by V. Mueller & Co., Ogden Ave., Van Buren and Honore Sts., Chicago. This instrument is a powerful, permanent magnet in the form of a surgical probe. It is about the size of an ordinary lead pencil, one end is sharpened for removing particles from the eye, and the other is flattened for use in cases where the fragment has penetrated into the flesh. The probe is made of one of the Honda high cobalt steels which has remarkable magnetic properties, and with ordinary care will retain its magnetic strength indefinitely.

*Mueller Magneprobe in use*

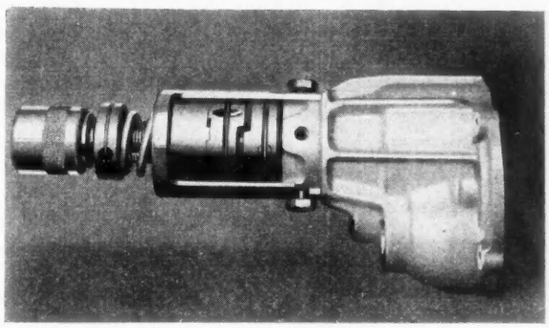
# AC Chevrolet Oil Filter

A NEW oil filter for Chevrolet sixes, both cars and trucks, has been announced by the AC Spark Plug Co., Flint, Mich. The filter, which is of the same construction as other AC filters, requires renewal of the filtering unit every 7000 miles. The device is being marketed complete with fittings as an accessory and retails at $5.

*New Chevrolet oil filter produced by AC*

# Independent Nut Tightening Attachment

THE Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, has brought out a Thor "Kick-Out" nut tightening attachment with a double slip clutch, which guarantees the correct tightness of every nut driven. The attachment is provided with an auxiliary clutch which operates under spring tension when a certain torque is applied to the front end of the attachment. When the nut is driven to this tension, the clutch disengages and lifts itself off on a cam which permits the front end of the attachment to remain stationary for one revolution. The attachment is adjustable to take care of a variation of sizes of nuts and bolts. It is made in several sizes and will drive any nut or bolt from 3/16 in. up to 1½ in. diameter. While designed especially for use with Thor high frequency 180 cycle electric tools, it can also be had for use on Universal electric tools of various sizes.

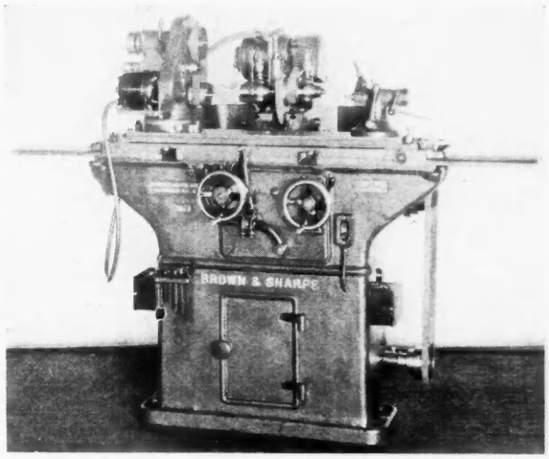


*Thor Kick-Out nut driving attachment*

WHEREVER Wheels and Shafts Turn" is the title of a new book recently published by The Timken Roller Bearing Co., Canton, Ohio, on the uses of anti-friction bearings. It has a section devoted to Timken bearings and automotive equipment.

# B. & S. Universal Grinding Machine

THE Brown & Sharpe Mfg. Co., Providence, R. I., has announced a No. 1 Universal grinding machine, motor-driven, which is similar to the belt-driven No. 1, except that it is equipped with three constant speed, balanced electric motors. It has a reversible wheel stand motor, which is reversed when the machine is used for internal grinding so that it is not necessary to swivel the wheel stand platen to a reverse position. The motors are integrally mounted on the headstock, on the wheel stand, and at the rear of the machine, and are carefully balanced.




*Motor-driven No. 1 Brown & Sharpe Universal grinding machine*

# Oxweld Bronze Welding Rod

A NEW bronze welding rod designated Oxweld No. 21 has been placed on the market by the Oxweld Acetylene Co., 30 East Forty-second Street, New York. This rod is recommended for all bronze welding applications and produces a weld metal as hard and wear-resistant as that formerly made with a manganese-bronze rod. By its use, tough and ductile weld metal having a tensile strength of over 45,000 lb. per sq. in. can be produced.

*Bronze welded 6 in. galvanized water line*

THE three Wright "Whirlwind" engines which powered the "Question Mark" that recently established a 150-hour non-stop flight record were fitted with Thompson valves. The valves are of the cupped-head, hollow-stem type and are filled with a salt. In operation the heat of the engine liquefies the salt, which then "splashes" within the hollow valve and helps to carry the heat from the head through the stem to the cooler parts of the engine.

First with the News

Reliable, Accurate

# News of the Industry

PAGE 458 VOLUME 60 *Philadelphia, Saturday, March 16, 1929* NUMBER 11

# March Schedules Indicate Record Output in Quarter

PHILADELPHIA, March 16—Automobile factories have swung into greater volume production this month with the prospect of turning out more cars and trucks than ever have been rolled off the assembly lines in any March. Their anticipation of a record showing seems only logical in the light of the January and February turnouts, which exceeded those of the corresponding months in any previous year. Increases in the production rate at a number of the plants range from 5 to 15 per cent and it appears certain that maximum capacity will be reached in several instances.

A conservative estimate of 500,000 vehicles for March has appeared previously in these columns. This, added to the 423,655 cars and trucks manufactured in January and the 468,328 announced as the figures for February output, brings an estimate for production in the first quarter of 1929 of 1,391,983 vehicles, a figure which is 227,498 in excess of the previous high mark for any first quarter, set in 1926 when 1,164,485 cars and trucks were produced.

In addition to exceeding any previous February production, the number of vehicles turned out last month ranks second to the greatest output for any month in the history of the industry. It was surpassed only by the production of 492,000 cars and trucks in August, 1928.

Dealers throughout the country have become more optimistic about the prospect of spring business. Sales continue to be generally favorable.

## White Has New Truck

CLEVELAND, March 14—Deliveries of the six-cylinder, light duty truck, Model 61, announced by the White Co. of this city, will begin about March 25, according to Walter C. White, president. The chassis will be available in two wheelbases, 148 in. and 170 in. Among the features of the vehicle are four-speed transmission, four-wheel hydraulic brakes and seven-bearing crankshaft. It has an allowable gross weight rating of 8000 to 10,500 lb.

### Graham-Paige Truck Reported

NEW YORK, March 13—It is understood on good authority here that a Graham-Paige truck is to be introduced in 18 months.

## Olds Shares Replacement Costs With Its Dealers

DETROIT, March 14—Olds Motor Works has initiated a new service policy whereby the factory pays to the dealer 50 per cent of the flat rate of the labor charge in making replacements of defective materials under the standard warranty. For about a year Oldsmobile owners have been able to obtain replacements under the warranty from any of the company's dealers. Such cost was then billed by the dealer making the replacement to the dealer who made the original sale.

Under the new service arrangement such bookkeeping has been eliminated, rebate coming direct from the factory. In as much as replacement labor usually amounts to about 50 per cent of the price charged to the owner, the new servicing plan amounts virtually to the factory paying the cost of installation. The company has begun construction of a new shipping warehouse to cost between $300,000 and $500,000.

## Order 338 Coaches

DETROIT, March 14—General Motors Truck Co. has announced receipt of an order for 288 coaches from Public Service Coordinated Transport Co., of Newark, and one for 50 such vehicles from the O. G. Schultz Management of Camden, N. J.

## Rolls-Royce Earnings Up

NEW YORK, March 13—Rolls-Royce of America, Inc., reports net profit for 1928 of $331,122 after all charges. This is equivalent to $9.46 a share on capital stock and compares with profit of $104,359, or $2.98 a share, in 1927.

### *Cars Abroad Gave Work to 115,000*

**NEW YORK, Mar. 13—Automobiles of American design sold in export markets during 1928 created jobs for 115,000 persons in those countries, according to George F. Bauer, secretary of the export department of the National Automobile Chamber of Commerce, in his report to the export managers of the Chamber, estimating that for every seven automobiles purchased abroad one man is given employment.**

## Locomobile Car Output Suspended Temporarily

NEW YORK, March 13—Suspension of production on new cars at the plant of the Locomobile Co. of America at Bridgeport, Conn., is in effect, pending reorganization of the company and designing of new lines as was indicated last week. The working force at the plant is at present reduced to 150 to 200 men, most of whom are at work preparing for the engineering of the new lines.

Meanwhile certain of the plant facilities and men are being kept busy in reconditioning Paramount cabs.

## Schmidt to Speak on East

NEW YORK, March 14—Walton Schmidt, field representative of the National Automobile Chamber of Commerce, who recently returned from a year's trip in the Far East, will report his impression of that market at the meeting of the Overseas Automotive Club at the Astor Thursday.

## Federal to Expand

DETROIT, March 13—Federal Motor Truck Co. plans to produce 8000 vehicles this year, compared with 5700 in 1928, M. L. Pulcher, president, said today in announcing that a new model of 1½-ton capacity has been added to the line. The new vehicle, equipped with a six-cylinder engine and four-wheel hydraulic brakes, will be designated the F-7.

# New Mack Bus Has Engine of 110 HP.

## Shock Insulators Liberally Used on Chassis of Two Wheelbases

NEW YORK, March 12 — Mack Trucks, Inc., New York, has developed a new six-cylinder bus, Model BK. Its engine develops 110 hp. at 1700 r.p.m. with a peak speed of about 2300 r.p.m. The engine in the new chassis has 4½ by 5½-in. cylinders and is supported on the frame at four points in Mack rubber shock insulators. The six cylinders are cast in a single block having removable heads in pairs. The crankshaft is case hardened, and counter weights are forged integral with it.

The carburetor is a Zenith double venturi type, Model 105 DC, of 1¼ in. size. The gasoline tank is mounted on the right side in a cradle, and has a capacity of 80 gal. Final drive is by bevel and spur gears, and a full-floating rear axle is used. Model BK is available in two standard wheelbases of 233 and 265 in. The 233-in. chassis, equipped with a 96-in. city-type body, will accommodate from 29 to 33 passengers, while the 265-in. wheelbase chassis will take 37 passengers.

The 265-in. chassis equipped with parlor car body having 30-in. seat centers will accommodate 33 passengers, or with seat centers of 34½ in., 29 passengers. Rubber shock insulators are very extensively used in the new model.

The four-wheel internal brakes are operated by a vacuum booster, and present a frictional area of 759 sq. in. The hand brake, which is mounted separately, has 144 sq. in. of frictional area.

## Hudson Plans Delivery of Truck Line in July

DETROIT, March 14—Hudson Motor Car Co. has completed plans to introduce a line of light delivery commercial vehicles about July 1. The trucks, equipped with Essex chassis, will be marketed through the present Hudson-Essex distributor and dealer organization, and it is announced that Sam C. Mitchell, for several years a Hudson sales executive, will handle the distribution.

According to a statement issued yesterday by the factory, Hudson's dealer organization has expanded rapidly since the first of the year and covers the country more intensively than at any time in the company's history.

## Chevrolet Heads Attend Funeral of C. L. Garner

DETROIT, March 12—Among the officials of the Chevrolet Motor Co. who attended funeral services for Clare L. Garner, zone sales manager of Chevrolet who died suddenly at Flint last week, were: W. S. Knudsen, president and general manager; C. F. Barth, vice-president in charge of manufacturing; R. H. Grant, vice-president in charge of sales; H. J. Klingler, general sales manager; J. C. Chick, regional sales director, and C. E. Wetherald, plant manager.

## G.M. Officials Maintain Silence on Opel Rumors

NEW YORK, March 13—Repeated rumors from Germany to the effect that General Motors Corp. has purchased or is purchasing the Opel works at Ruesselheim have elicited neither confirmation nor denial from officers of General Motors here. It is well known that Alfred P. Sloan, Jr., president of the corporation, and J. D. Mooney, president of General Motors Export Co., which presumably would have charge of operations at the Opel plant should it become the property of General Motors, are at present in Europe. Whether this is their errand abroad cannot be learned.

According to the reports which have come from German sources the deal has been put through, giving to the American corporation 76 per cent of the total shares in the Opel works in exchange for $30,000,000. Further details included in the reports from overseas indicate that General Motors will continue to manufacture Opel cars in this plant but will also manufacture Chevrolet cars for the European market there.

## G.M.A.C. Shows Profit of $10,370,453 for 1928

NEW YORK, March 12—General Motors Acceptance Corp. reports net profits from all operations for 1928, after all charges, as $10,370,453. This is equivalent to 18.52 per cent of average capital funds employed, and compares with 19.04 per cent on capital funds employed in 1927. After payment of dividends there was charged to undivided profits $3,720,453 as compared with $2,112,805 the previous year.

The corporation reported 826,902 retail purchases on the books at the close of 1928, and a total business volume of $967,675,575, compared with $842,819,870 in 1927.

## Durant Increases Prices

DETROIT, March 13—Durant Motors, Inc., has announced the following price changes: an increase of $30 on Model Four "40" two-door sedan to $625; an increase from $650 to $685 on the roadster Six "60," and an increase in de luxe equipment on the Six "60" four-door sedan and cabriolet of $15. The price of each of the two last mentioned models is $750.

### Ford Not Going to Germany

DETROIT, March 14—"Henry Ford is not going to Germany to my knowledge," an executive of Ford Motor Co. said today in response to a report published in New York that the manufacturer would go there soon to study business conditions.

## *Business in Brief*

*Written by the Guaranty Trust Co., New York, exclusively for* AUTOMOTIVE INDUSTRIES.

NEW YORK, March 14—The inauguration of President Hoover last week was accompanied by manifestations in every quarter of the general business confidence that is expected to continue throughout his administration. Industrial activity and consumption continue at levels above those of a year ago. At the big business centers of the country, jobbing and wholesale trade is increasing. The heavy lines such as steel production are among the most active industries.

### FREIGHT CAR LOADINGS

Car loadings for the week ended February 23 totaled 907,337 cars. As a result of the Washington's Birthday holiday, the current total was 50,714 cars below that in the preceding week, but 37,920 cars above that in the corresponding week last year.

### FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended March 9 was 98.2, which compares with 98.4 the week before and 98.0 two weeks before.

### BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended March 6 were 24 per cent above those in the similar week last year.

### STOCK MARKET

The stock market last week was featured by the high interest rate on call money, which ranged from 8 to 12 per cent. The high rate of call money, combined with extensive selling to realize profits, kept the market under a constant state of pressure. Trading was on a diminishing scale; and the net changes for the week showed considerable irregularity, with heavy declines in some stocks.

Brokers' loans in New York City increased $140,000,000 during the week ended March 6. This amount, added to the increase of $30,000,000 the week before, practically cancels the decline during the preceding two weeks. Total brokers' loans in New York City on March 6 amounted to $5,647,000,000, which is only $22,000,000 below the high record reached on February 6, 1929.

### FEDERAL RESERVE REPORT

The consolidated statement of the Federal Reserve banks for the week ended March 6 showed an increase in holdings of discounted bills of $36,700,000, which was practically offset by decreases of $29,400,000 in holdings of bills bought in the open market and $3,400,000 in holdings of Government securities. The reserve ratio on March 6 was 69.7 per cent, as against 69.9 per cent a week earlier.

# Steel Mills Urged to Speed Shipments

## Deliveries Are Late as Prospect Looms for Heavy Orders in April

NEW YORK, March 14—Speeding up of shipments is the outstanding activity of both steel producers and automotive consumers. In some descriptions of finished steel, mills are considerably behind in deliveries and are receiving long distance phone calls daily from their customers. While producers in some lines are making strenuous efforts to clear the decks for second quarter business and prices by insisting that all first quarter contracts that are not specified against by tomorrow will lapse, it is certain that heavy tonnages of first quarter steel will be shipped in April.

Makers of cold-finished steel bars anticipate little trouble in having consumers assent to the $2 per ton advance which they have announced for second quarter contracts as the result of the higher price they are called upon to pay for their hot-rolled bars. Finishers will have to furnish by tomorrow specifications against their hot-rolled contracts at the first quarter price, so they are merely passing their own troubles on to their customers. The cold-rolled strip-steel market has settled on a $2.85 basis, with relatively little demand so far for second quarter because of the heavy tonnages which consumers have coming to them on old contracts. The $2.85 price, considering the new card of extras, represents on the average a fair increase over previously going prices. Demand for full-finished automobile sheets continues brisk. There is much overlapping of old and new business, and it is difficult, therefore, to say what is really new business. The market for black and blue annealed sheets continues firm, with that for full-finished sheets strong.

While the showing made by the latest unfilled tonnage statement of the leading producer, disclosing a gain of only 34,854 tons over the preceding month at the close of business on Feb. 28, appears to have been somewhat of a disappointment to Wall Street, where a gain in excess of 100,000 tons had been looked for, it sheds little light one way or the other on the steel situation. Although the corporation's unfilled obligations were some 250,000 tons less than on Feb. 29, 1928, this cannot be interpreted as a decline in steel demand because of a hand-to-mouth buying having come in still stronger in the last year and because of the heavier rate of shipments made possible by increased efficiency and capacity extension. All that can possibly be gleaned from the statement is that steel bought in December and January does not have to be bought in February.

## *Wisconsin-Made Cars Taxed in Milwaukee*

**MILWAUKEE, March 14—That merchandise, including automobiles, stored in Wisconsin warehouses is exempt from taxation if it originated outside the state, but subject to tax if it was made in Wisconsin, is revealed by a decision of the Supreme Court of Wisconsin in an action directly affecting the automobile question.**

## Cars Shown Nearly Half Shipments from Michigan

WASHINGTON, March 14—Passenger car shipments amounting to $45,843,903 constituted 49 per cent of Michigan's total merchandise exports during the second quarter of 1928, which were $92,991,586, the Department of Commerce announced this week. Total Michigan shipments for the quarter were $1,471,490 less than in the corresponding period of 1927. Ohio exports during the quarter amounted to $50,381,465, of which passenger car shipments contributed $6,210,789, or 12 per cent.

In addition to passenger car exports, Michigan shipped parts of automobiles, valued at $19,412,795; trucks and buses, $9,019,943; accessories and parts, $438,917; tires $304,020, and tractors and parts $227,868. Ohio shipped tires valued at $4,841,647; parts, $2,984,038, and trucks and buses, $2,521,988, during the quarter.

## Los Angeles Reo Branch Becomes Distributorship

DETROIT, March 14—H. E. Woodward, for the past five years manager of the Reo Branch at Los Angeles, will take over the branch tomorrow and operate it as a distributorship for southern California, Arizona and part of Nevada.

C. E. Eldridge, general sales manager of Reo, in announcing the change, said that he could not divulge the amount of money involved but that it was above $300,000.

## Forming New Finance Firm

DETROIT, March 13—A new airplane finance and holding company, to be known as Inter-Allied Aeronautics, Inc., is in process of formation here with a management and board comprising several prominent technical experts, including William B. Stout, president of the Stout Metal Airplane Division, Ford Motor Co.; Brigadier General Milton F. Davis, and Professor Alexander Klemin, New York University. The firm will be financed to the extent of approximately $6,000,000 with public offering to be made shortly.

# Exports in January Set New High Mark

## Large Shipments of Low-Priced Cars Advance to $17,871,305

WASHINGTON, March 14—Registering an increase of $15,657,862, or 49 per cent, American automotive shipments during January amounted to $47,563,655, a new high record for exports during the first month of the year, according to statistics compiled by the Department of Commerce and made public this week. January exports exceeded those for the month of December by $11,534,409.

Due to increased shipments in the low price group, passenger car exports mounted from 20,945 valued at $16,721,811 in December to 24,631 valued at $17,871,305 in January. Shipments in the two other higher price groups were below the December total. Truck shipments rose from 9009 valued at $6,726,519 to 13,034 valued at $7,984,531. While increases were reported for all classes, the "up to 1-ton" group showed the greatest advance. Shipments of all other American automotive products totaled $21,757,819, as compared with $12,580,916 in December, an increase of almost 73 per cent.

Twenty per cent of the passenger cars and 32 per cent of the trucks shipped from the United States during January were purchased by Argentina. Australia, Canada and British South Africa were next leading passenger car markets and Australia and Brazil were the next leading truck markets.

## Million Planes Predicted

CLEVELAND, March 12—"Seven years and a half from now will see one and a half million planes in service in this country," said Capt. L. M. Woolson, aeronautical and research engineer of the Packard Motor Co., addressing the Cleveland section, S.A.E., on "Air Transportation Contrasted with Ground Transportation."

## C.I.T. Buys Two Firms

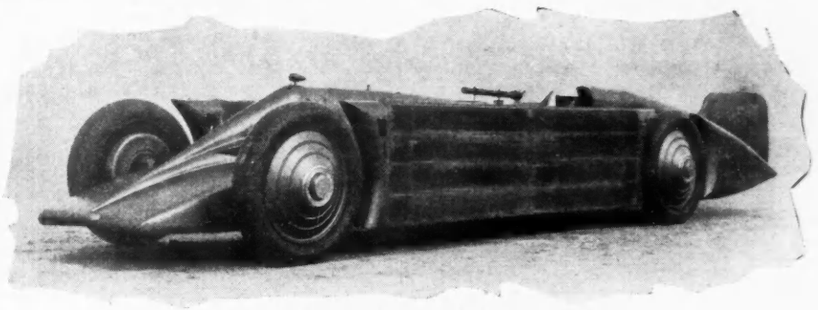
NEW YORK, March 12—The Commercial Investment Trust Corp. has acquired the Motor Dealers' Credit Corp. and the Pierce-Arrow Finance Corp., adding $125,000,000 to the yearly volume of C. I. T., and giving it a combined annual volume of $400,000,000, it is announced by Henry Ittleson, president of the C. I. T.

### Studebaker Doubles Output

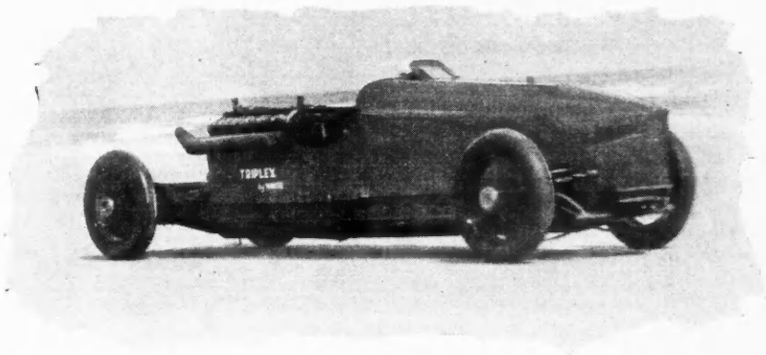
SOUTH BEND, IND., March 13—Capacity of the main body building plant of the Studebaker Corporation has been increased from 30 to 60 bodies an hour. Beginning about May 1 all Studebaker body requirements, with the exception of special types, will be produced in the South Bend plant, it is announced.

# Major Segrave in "Golden Arrow" Sets New Record

DAYTONA BEACH, FLA., March 13—The new world's record for automobiles, an average of 231.36246, established Monday by Major H. O. D. Segrave in his 1000-hp. Irving Napier "Golden Arrow," apparently will not be exceeded for some time, as far as racing in this country is concerned. After witnessing the fatal wreck of the "Triplex," owned by J. M. White of Philadelphia, this afternoon, Major Segrave announced that he "was through with racing in America this year." What Malcolm Campbell will accomplish in South Africa, however, remains to be seen.



*The New Speed Champion*




*J. M. White's "Triplex"*

*Major H. O. D. Segrave*

Lee Bible, close friend of Mr. White, was crushed to death at the wheel of the "Triplex" when the three-ton car rolled over on the sand after it had been driven close to the surf, in its attempt to defend its record of 207.552 m.p.h. of a year ago with Ray Keech driving. A Pathe news photographer, Charles Traub, was killed as he sought to flee from the path of the swerving racer.

The two trials in which Major Segrave set his world's record were without incident except for track hazards. Twice the intrepid Briton drove across the measured mile on the Ocean Speedway. With fair visibility, and an east wind blowing from the ocean, the first run, north, was made in 15.55 seconds for the mile, an average speed of 231.51125 m.p.h. The second run, southward, clocked at 15.57 seconds for the course, an average of 231.21387 m.p.h. The average elapsed time for the two runs was 15.56 seconds.

No disks were attached to the wheels of the car due to the high wind, which aided in keeping it in the course. Once a sand gully wrenched the car and caused a radiator pipe to burst, spraying the driver with steam, but otherwise the car was in excellent mechanical condition at the end of the trials.

## Bulgarian Market Active

WASHINGTON, March 14—About 40 per cent of all automobiles in Bulgaria are used as taxicabs, according to the Department of Commerce. The last half of 1928, says the department, was the most active period in the country's automotive history, 560 cars of all types being sold. American products showed a substantial gain last year, says the department.

## Pines Winterfront to Increase Stock

CHICAGO, March 12—As part of a new capital plan to provide for expansion, rights and stock dividends amounting to $12,800,000, on the basis of yesterday's closing price of $204 a share, were voted to stockholders by directors of the Pines Winterfront Co. The directors voted to increase the present 100,000 shares of "A" and "B" stock to 500,000 shares of $5 par value capital stock. A stockholders' meeting to vote on the proposal has been called for April 5.

After the ratification the present stock would be exchanged on a share for share basis, and rights issued to stockholders of record April 15, to purchase two additional new shares for each share held at $11 a share. The 300,000 shares of capital stock then to be outstanding would be placed on a $1 annual basis, equivalent to the $3 paid on the "A" and "B" stocks. In addition the directors will declare stock dividends at the rate of three per cent a year, two shares of the remaining unissued 200,000 shares to be paid out each quarter for each 100 shares held.

## Stamping Firm Buys Site

TOLEDO, March 13—The City Auto Stamping Co. has purchased a 20-acre factory site in West Toledo, near the Dura Co. plant and has authorized architects to prepare plans for a $500,000 plant. Construction is scheduled to begin April 1. Amos Lint is president of the new company and C. O. Miniger, president of Electric Auto Lite, is heavily interested.

## Hudson Appoints Gillen

DETROIT, March 12—I. E. Gillen, formerly field representative for the Aaron DeRoy Motor Car Co. of Detroit, state distributors for the Hudson and Essex motor cars, has been appointed manager of the Lansing Hudson-Essex branch.

# Men of the Industry and What They Are Doing

## Republic Truck Directors Elect Hanks President

At a meeting of the board of directors of the Republic Motor Truck Co., Inc., G. R. Hanks, president of the Linn Mfg. Corp., tractor manufacturing division of Republic, was elected president of Republic, a post made vacant by the death of O. W. Hayes.

T. M. House, formerly Pacific Coast manager for Republic, was made vice-president in full charge of the Alma plant. Joseph A. Bower, of the New York Trust Co., was elected chairman of the board of directors.

### Evans Auto Names Bassick

Evans Auto Loading Co., at its recent meeting elected E. W. Bassick, formerly president of the Bassick Mfg. Co., as a director to succeed W. D. Richardson. The company reelected its officers and declared its quarterly dividend of 62½ cents, payable April 1 to stockholders of record March 20.

### Connor and Miller Appointed

T. E. Connor and C. H. Miller have been appointed division commercial car representatives of The Studebaker Corp. of America, according to an announcement by Charles H. Wondries, manager of Studebaker's commercial car division.

### Callan Joins American Aero

Commander John Lansing Callan has joined the staff of the American Aeronautical Corp. and will be in charge of exhibits of American-Marchettis made by the company, at the two aviation shows impending. Commander Callan is president of the U. S. Air Express.

### Warman Gets Durant Post

Bryan Warman has been appointed advertising manager of Durant Motors, according to R. T. Hodgkins, general sales manager. Mr. Warman will have offices in the new Durant headquarters in the Maccabee Building, Detroit.

### Runciman Joins Strom

H. D. Runciman has been appointed vice-president in charge of eastern sales, with headquarters in Philadelphia, for the Strom Steel Ball Co., of Chicago. Mr. Runciman was formerly general manager of the Hoover Steel Ball Co., Ann Arbor, Mich.

### Snodgrass Succeeds Ball

Crissy K. Ball has resigned as acting general manager of the American-LaFrance and Foamite Company plant in Elmira. Mr. Ball was made general manager following the resignation of Don G. Case in July, 1928. H. S. Snodgrass, who has been in charge of the materials division of the Elmira factory, will succeed Mr. Ball.

*R. P. Rice*

*Who fills the newly created post, chairman of the board, American Eagle Aircraft Corp., Kansas City. He will continue to head the Whippet distributorship in that city also.*

### Cutler-Hammer Names Jones

P. S. Jones has been named manager of the New York District Office of Cutler-Hammer, Inc., March 1, succeeding C. W. Yerger. T. S. Towle, formerly a sales engineer of the Pittsburgh office, becomes manager at Pittsburgh. G. E. Hunt has been placed in charge of distributors' sales.

### Plan Trip to Tokio

Howard E. Coffin, vice-president of the Hudson Motor Car Co. and president of the National Airport Transport, and William B. Mayo, chief engineer of the Ford Motor Co., will be among the Detroit delegates to the World's Engineering Congress at Tokio.

### Robbins Joins Gabriel

Walter C. Robbins, for the past three years chief engineer of the Houde Engineering Company of Buffalo, has been appointed chief engineer of the Gabriel Snubber Mfg. Co. of Cleveland.

### Moore Leaves HiLab

Thomas Moore, sales manager for the HiLab division of the Hide Leather and Belting Co. for the past four years, has severed his connection with the company as of March 15. He has not announced his future plans.

### Morine Made Director

E. C. Morine, president of the Waterproof Body Company, a subsidiary of Allied Motors Industries, Inc., was elected a director of the latter March 6.

## Jeschke Tool Co. Elects Officers for New Year

Frank J. Jeschke became vice-president of the Jeschke Tool Co. in place of Frank V. Cooper. Raymond J. Francis has been elected secretary-treasurer in place of Frank V. Cooper, who also held the title of treasurer, and C. W. Floss, secretary.

Calvin M. Clavert, formerly with the Hutto Engineering Co., has been appointed assistant general manager.

### Heminway Completes Trip

M. L. Heminway, managing director of the Motor and Equipment Association, returned this week from a trip to the South and Southwest during which he called on members of the association throughout that territory. Mr. Heminway reports that wholesale members in that territory indicate a decided trend upward in sales so far this year.

### Richardson Elected

Captain Holden C. Richardson, former chief of the design division of the Bureau of Aeronautics, U. S. Navy Department, has been elected vice-president in charge of engineering and design of the Great Lakes Aircraft Corp. of Cleveland.

### Walker on West Coast

Helm Walker, vice-president in charge of sales of the Windsor Corp. in St. Louis, is making a sales analysis in Los Angeles, San Francisco and the Western Coast. He plans to be away for several days.

### Link-Belt Elects Watson

James S. Watson has been elected vice-president of the Link-Belt Co., with headquarters at the Dodge works of the company in Indianapolis. Mr. Watson has been general manager of the Indianapolis plant for several years.

### Kinnear and Grant Named

H. D. Kinnear has been assigned to Gabriel's Detroit office, in charge of factory sales, announced George H. Ralls, president of the Gabriel Snubber Mfg. Co.

Frank L. Grant, who has been working in the Gabriel engineering laboratory, is assigned to his organization's Cleveland office to work on factory sales.

### Serrano Goes Abroad

E. H. Serrano, export manager of the Windsor Corporation in St. Louis, sailed for an extended analysis of business conditions in Germany, Spain, England and the cities of Paris, Budapest and Stockholm.

# Aluminum Concern Will Market Stock

## Cincinnati Company to Offer Public $2,500,000 of its Capital

CINCINNATI, March 13—Announcement that $2,500,000 worth of stock of Aluminum Industries, Inc., of this city will be placed on the market through the Cincinnati Stock Exchange and the New York Curb within a few days and the fact that the stock already has been ten times over-subscribed, reflect the progress of the organization.

Aluminum Industries, Inc., which was organized in 1920 and which started business with 20 employees in a small building, today is housed in a plant covering five and a half acres and is one of the largest consumers of aluminum in America, a big producer of aluminum alloys, and controls selling agencies throughout the world. Organized primarily to manufacture pistons, the company's permanent mold castings division, sand castings division and other diversified lines have been developed to a point threatening to overshadow its original business.

The corporation is headed by John Eckerle, president; H. J. Hater, vice-president and general manager; J. P. Andrae, vice-president, and F. J. Glennon, vice-president and general sales manager, with R. T. Mesker, secretary. Glennon is widely known in the automotive industry.

## Stockholders to Decide Sale of Mono Aircraft

MOLINE, ILL., March 12—Stockholders of Mono Aircraft, Inc., have been called to vote March 18 upon ratification of sale of the airplane company, which has been operating as a subsidiary of the Velie Motors Corp. which suspended production several weeks ago, to Augustine & Co., and Love, Bryant & Co., St. Louis brokerage firms.

W. L. Velie, Jr., head of the Mono Aircraft, last week completed negotiations for the sale to the brokerage firms of assets of the company, consisting chiefly of patent rights to the manufacture of the Monocoupe. Sale of the Velie airplane engine will also probably be included in the final deal, and Mr. Velie will be temporarily associated with the new owners.

Plans for future of the Monocoupe have not been revealed although the purchasers announced that production would be continued in the Moline plants.

## Tillotson Adds Plant

TOLEDO, March 12—Tillotson Mfg. Co., makers of carburetors, have let a contract for a new four-story addition to their present plant, adding 21,000 sq. ft. at an investment of nearly $250,000.

# Financial Notes

**Studebaker Corp. of America** reports net earnings for 1928 after all charges as $13,947,181. This is equivalent after preferred dividend to $7.16 a share on common stock and compares with earnings of $11,937,861, or $6.09 a share for the previous year, an increase of 16.8 per cent. Net sales were $157,692,207 as compared with $134,007,798 in 1927. Cars sold numbered 136,205 as compared with 116,740 for the previous year.

**Curtiss Aeroplane & Motor Co., Inc.,** and subsidiaries report net profit after all charges for 1928 as $1,528,782. This is equivalent to $4.01 a share on no par common stock outstanding at the end of the year, and compares with $794,148, or $2.54 a share, on stock outstanding at the end of 1927.

**Emmerson-Brantingham Corp.** reports a loss of $614,026 from operations, after depreciation and interest, for the 14 months, ended Dec. 31, 1928, as compared with a net loss of $591,551 in the fiscal year ended Oct. 31, 1927. The report reflects a year of readjustment. C. S. Brantingham, president, reported that sales showed marked improvement over previous year.

**Chicago Pneumatic Tool Co.** has declared an initial quarterly dividend of 87½ cents on preferred stock, payable April 1 to holders of record March 20.

**Stromberg Carburetor Co. of America** has declared an initial quarterly dividend of 75 cents on new stock issued.

**Timken Detroit Axle Co.** has declared regular quarterly dividend of 15 cents and an extra dividend of five cents, both payable April 1 to holders of record March 15.

**Otis Steel Co.** reports net profit for 1928, after all charges including Federal taxes, as $3,370,982, equal to $3.15 a share on 807,002 shares of common stock outstanding. This compares with net of $1,382,879, or 75 cents a share on 741,802 shares in 1927.

**American Car & Foundry Co.** has declared regular quarterly dividends of $1.50 on common and 1¾ per cent on preferred stocks, both payable April 1 to holders of record March 15.

**Waukesha Motor Co.** has declared regular quarterly dividend of 75 cents payable April 1 to holders of record March 15.

**Electric Storage Battery Co.** and Willard Storage Battery Co. report net profit for 1928 after all charges as $6,335,485. This is equivalent to $7.81 a share on the combined stock of the two companies and compares with $5,716,426 and $7.08 for 1927.

**Borg-Warner Corporation** reports that the consolidated net profit of the constituent properties in the year ended Dec. 31, 1928, after depreciation, taxes and other charges was $4,610,831; which, after allowance for a full year's dividend on the preferred stock, equaled $10.64 a share on the 410,000 shares of $10 par value Borg-Warner stock outstanding at the close of the year. This will compare with $3,055,401 on a consolidated basis in 1927, or $6.85 a share on the same capitalization as now existing.

**Motor Products Corp.** reports net earnings for 1928 after all charges of $2,643,749. This is equivalent after preferred dividends to $19.10 a share on common stock and compares with net profit for 1927 of $575,879. Directors have called a special meeting of stockholders for March 25 to act on a plan for increasing the capital to not more than 500,000 shares of no par value. There are at present authorized 200,000 shares, of which 130,406 are outstanding.

**McCord Radiator & Mfg. Co.** and subsidiaries report net income for 1928 after all charges as $746,497. This compares with net income for the previous year of $705,496.

**Texas Corp.** and subsidiaries report net profit for 1928 after all charges as $45,073,879. This is equivalent to $5.34 a share on stock and compares with earnings of $20,029,405, or $2.77 a share, for the previous year.

**Burgess-Norton Co.** announces that its common stock earned $36.09 a share in 1928, before Federal taxes and after setting aside 8 per cent required on preferred stock. Sales for the year showed an increase of 37½ per cent over 1927.

**Reo Motor Car Co.** reports net profit for 1928 after all charges as $5,083,588. This is equivalent to $2.54 a share and compares with earnings for the previous year of $4,734,331, or $2.36 a share.

**Murray Corp. of America** and subsidiaries report net earnings for 1928, after deductions for Federal taxes, etc., of $1,812,426. The report shows current assets of $12,954,513 and current liabilities of $1,420,299, a ratio of approximately 8½ to 1.

**Ludlum Steel Co.** reports net income for 1928 as $586,610, or $4.34 a share, on common stock. This compares with $225,436, or $1.67 a share, for the previous year.

**Reynolds Spring Co.** reports net profit for 1928 as $3,591, which compares with net loss in 1927 of $162,369.

**John Warren Watson Co.** reports net loss for 1928 as $348,930. This compares with net income for 1927 of $503,725.

**Western Auto Supply Co.** of Kansas City reports net profit for 1928 after all charges of $1,002,607, equivalent to $5.92 a share on Class A and B stock, compared with $931,577 profit for 1927.

**Hydraulic Brake Co.** reports net income for the year 1928 after all charges, as $315,334, equal to $7.09 a share on 44,476 shares of capital stock outstanding. This compares with $53,840 or $1.21 a share on the same number of outstanding shares in 1927.

**Indian Motorcycle Co.** has declared quarterly preferred dividend of $1.75 payable April 1 to holders of record March 20.

## *Heavy Automotive Demand for Hardwoods Results in Price Increase at Southern Mills*

ATLANTA, March 14—The heavy production schedules that are being maintained by the automobile factories in the North, and by the body manufacturers in both the northern and southern territory, have made this industry the heaviest hardwood buyer of all consumers during the past two months. With the volume of business reported by Atlanta wholesalers and mill representatives to be considerably above normal for this period, reports of a similar nature are reaching here from other important lumber markets in the southeastern district.

In the automobile field demand is running heavily to sap gum and white ash, while body manufacturers are buying liberally of these two hardwoods and also of maple and elm. The price tendency has been upward for the past several weeks and early in March quotations by the mills in this section were from $5 to $10 per thousand ft. higher than they were the early part of February.

That there will be still further increases, especially in the thicker dimensions of white ash, seems certain, due to the fact that weather conditions have been extremely bad in the southeast the last two weeks, causing a heavy curtailment of production by virtually all mills in this district. Shipments and bookings both are well in excess of present output and very few mills have any surplus at all on hand. Dry hardwood is difficult to obtain at any price.

## LeBlond-Schacht Announces New Six-Cylinder Truck

CINCINNATI, March 13—Powered with a six-cylinder, 70 hp. engine, capable of 40 miles an hour, a new 2-ton truck is announced by the LeBlond-Schacht Co., following many months of experiments and tests in all kinds of weather.

The new truck is said to embody many outstanding features. It is equipped with four-wheel, hydraulic brakes, full-floating Timken rear axle, 32 x 6 ten-ply pneumatic tires—dual rear, Budd disk wheels, Delco-Remy lights and starter, Ross cam and lever steering, burst-proof radiator and rubber engine mounting. It has four speeds forward.

## Arrow Head Products Will Have New Plants

MINNEAPOLIS, March 13—The Arrow Head Steel Products Co., which has been operating its Minneapolis, Minn., plant 24 hours a day for two years, plans to erect a $500,000 plant in Buffalo, N. Y. It will be 36,000 square feet on the ground and employ 150 men. The output will be $560,000 worth of wrist pins and pistons annually. Work on the plant is to begin in a few weeks. Work has begun on a $275,000 addition to the Minneapolis plant. President F. C. Bahr says of this amount $200,000 will be for machinery and other equipment. Seventy-five men will be added to the present force of 275 employes. The addition will be to make wrist pins only.

## G.M. Canadian Production Increases 39 Per Cent

OSHAWA, ONT., March 14—General Motors Co. of Canada, Ltd., reports an increase in February production of 39 per cent, compared with the corresponding month last year. According to J. H. Beaton, general sales manager of the company, shipments from Canadian plants in February totaled 12,192 cars and trucks. The company last month employed 8264 persons, an increase of 2815 over the employment figures a year before.

The Oshawa plant showed an employment increase of from 501 to 5100; the Walkerville plant, where the company recently resumed manufacture of Chevrolet engines, an increase of from 200 to 1678. The new Regina plant is employing 722 men.

R. S. McLaughlin, president of the company, and chairman of the board of the newly acquired McKinnon division, recently announced that within a year the McKinnon plant at St. Catherines should produce $5,000,000 worth of automotive parts.

## Stromberg Motor Devices Will Move to South Bend

CHICAGO, March 12—Following the acquisition last week of controlling interest in the Stromberg Carburetor Co. of America by Vincent Bendix and Curtiss and Wright aeronautical interests, Mr. Bendix announced here last night that the Chicago Stromberg plant, known as the Stromberg Motor Devices Co., will be moved to South Bend, Ind., where the principal Bendix shops are located.

It was also announced that the Bendix Brake Co. will start shipments April 1 on a new contract calling for 150,000 sets of brakes, and that the Eclipse Machine Co., now controlled by Bendix interests, has just collected $1,125,000 in settlement of patent infringements.

## Wagon Production Drops

WASHINGTON, March 14—The production of horse-drawn vehicles in 1927 amounted to $22,463,183, 23.3 per cent below the 1925 output of $30,052,430, according to the biennial census just completed by the U. S. Bureau of Census. Carriages, wagons, sleighs, sleds and wheelbarrows are included in the figures. There were 161 plants engaged in such manufacture in 1927, compared with 233 in 1925.

# Lamont Will Draft Man for Car Post

WASHINGTON, March 14—Two key positions in the new Hoover administration, from the automobile industry's viewpoint, are expected to be filled by Secretary of Commerce Lamont within the next 60 days. From the industry's standpoint, probably the most important of these is the appointment of a successor to fill the post of H. O. Smith, chief of the automobile division of the Department of Commerce, who resigned on February 1 on account of ill-health.

It was stated for the new secretary that he is attempting to "draft" the services of a prominent official in the automobile industry, the appointment to be made primarily on the recommendation of the automobile manufacturers themselves.

The second position is that of a successor to H. R. Buckley, Automotive Trade Commissioner for Europe, who resigned last week. Prior to his appointment as Automotive Trade Commissioner of Europe last November, Mr. Buckley was Trade Commissioner of Australia.

## Rubber Contract Signed

CLEVELAND, March 11—The Paine & Williams Co. announces that it has closed a long term contract with the Seiberling Rubber Co. to represent the latter as sole sales agent for all rubber items, excepting tires and tubes, manufactured for the automotive industry. The Seiberling company will cooperate with Paine & Williams in the installation of special machinery for the manufacture of running board mats.

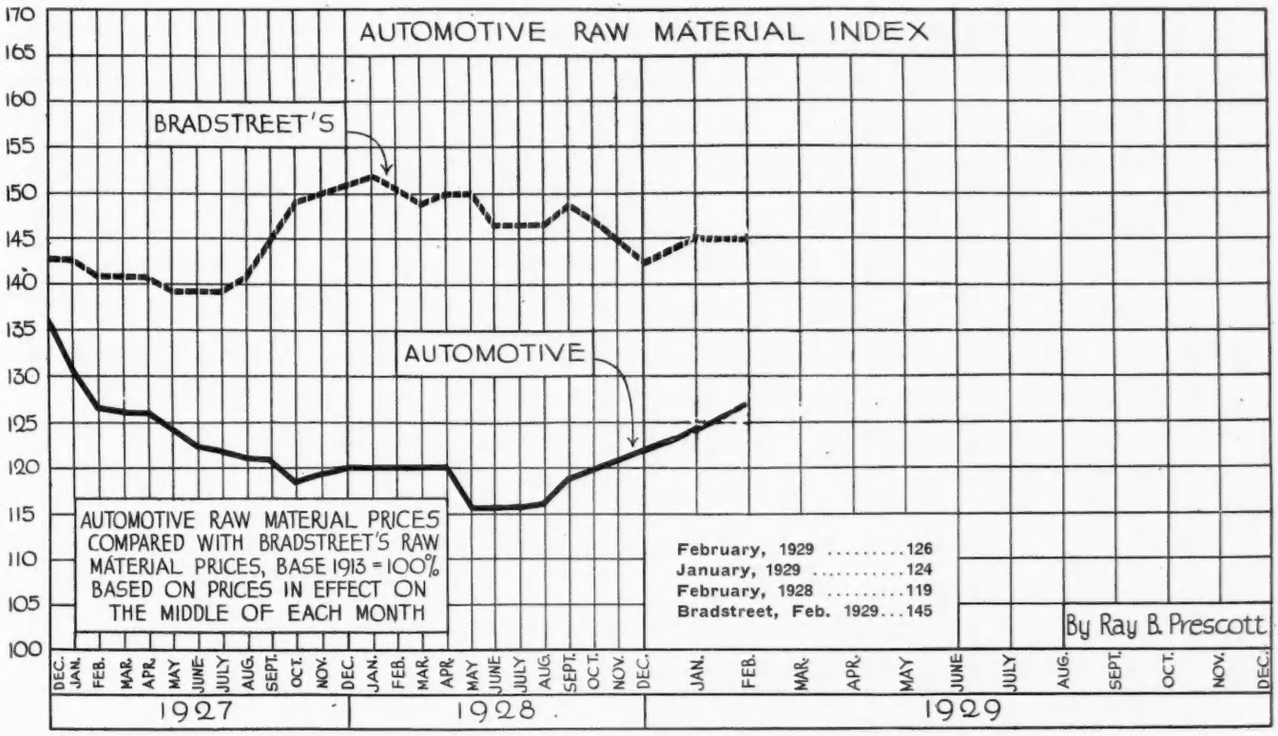
## Lincoln Gets Engine Rights

CHICAGO, March 12—Lincoln Aircraft Company, Inc., of Lincoln, Nebr., has announced its purchase of the exclusive rights in the United States and Canada for the manufacture and sales of Wright Moorehouse airplane engine. The engine is to be used in what is claimed to be the lightest plane in the world, a 500-pound sport biplane.

## Offers Stock Issue

NEW YORK, March 13—Brunner-Winkle Aircraft Corp. of Delaware, recently organized to succeed a similar corporation in New York, has issued 50,000 shares of common stock for public subscription. The company operates a manufacturing plant at Long Island City, manufacturing Bird planes. Proceeds of the sale of the stock will be used for expansion.

# Raw Material Prices Advance Two Points




## New Departure Outlines Large Building Program

BRISTOL, CONN., March 12—The factory extension program recently announced by the New Departure Manufacturing Company of Bristol includes new buildings which will add 250,000 sq. ft. of floor space to the main works at Bristol and approximately 80,000 sq. ft. to the Meriden plant. The new addition to the forge plant at Bristol has just been completed and added 25,000 sq. ft., so that the total of increased floor space within the year will reach 355,200 sq. ft.

The new building at Bristol will be 404 ft. by 128 ft. and will house the finish race grinding department. At the Meriden plant the extension will be on the northeast side of the present factory and will be 220 ft. by 106 ft., four stories high. This addition will house an extension of all manufacturing operations.

## Bassick Sells Site

NEWARK, N. J., March 11—The Bassick Co., subsidiary of the Stewart-Warner Corp., has sold an industrial site, part of their Newark holdings, to the Kohler Co., of Kohler, Wis. The parcel of land has a 400 ft. front and is served by a railway spur. The Kohler Co. will erect a large building.

## Studebaker Payroll High

SOUTH BEND, IND., March 11—Six thousand more persons are on the payrolls of Studebaker Corp. at its enlarged South Bend factories this year than last, A. R. Erskine, president, announced today. Early in 1928 there were 10,000, he said. Today there are 16,000, an increase of 60 per cent. This is the result not only of an increased volume of business, but of the transfer of the assembly lines of all Studebaker and Erskine cars from Detroit to South Bend, Mr. Erskine explained.

## Air Commerce Increases Are Reported by A.C.C.

NEW YORK, March 13—Air transport companies in the United States operating 294 single and multi-engine planes flew a total of 10,472,024 miles on regularly scheduled routes and carried 52,934 passengers during the year 1928, according to Aircraft Year Book figures released by the Aeronautical Chamber of Commerce. This shows an increase over 1927 of 420 per cent in passenger traffic and 100 per cent in mileage flown.

"This tremendous increase," the statement says, "was accompanied by a three fold increase in air mail poundage. In 1927 the air lines in the United States carried 1,222,843 pounds of mail. In 1928 they carried 3,632,059 pounds. Reports from all the operators having express contracts indicate a healthy growth in business during the year. Approximately 2000 tons were carried."

Cleveland will be the scene of the first annual convention of airport operators, to be held May 16-18. The convention will be staged under the auspices of the airport section of the Aeronautical Chamber of Commerce of America.

## Columbus Tire & Rubber in New Reorganization

COLUMBUS, OHIO, March 12—Steps are being taken by former officers and stockholders of the Columbus Tire & Rubber Co., which went into the hands of W. C. Willard as receiver several weeks ago, to reorganize the company and take over the tire and tube plant located here.

The company has been organized for about eight years and about two years ago it was reorganized with additional capital, having now 2000 shares of no par common stock and $150,000 in 8 per cent preferred. The plant has been idle for the past three months and the receivership was brought about by A. Simons, the president.

## Boeing Pilots Set Record

CHICAGO, March 11—Pilots J. H. Thompson, Frank Yeager, and George Myers, of the Boeing Air Transport lines, collaborated last week in setting a new record for mail delivery from San Francisco to Chicago. The route, a distance of 1949 miles, was covered in 12 hours, 43 minutes, bettering the previous record of 14 hours, 55 minutes, by more than two hours.

## Firestone Considers South

ATLANTA, March 13—Harvey S. Firestone, president, Firestone Tire & Rubber Co., and other officials of the company visited Atlanta recent to investigate conditions in this district with a view to the establishment of a branch plant in the Southeast later.

# By-Products Save Millions for Ford

DETROIT, March 11—What Henry Ford has accomplished in manufacturing economy by the saving of factory surpluses is disclosed in a report on the sale of by-products made public by the Ford Motor Co. Supplementing a recent statement on the volume of by-products obtained from the Ford organization in 1928, the report shows an increase in value of $3,758,132.91 over 1927 sales. Total by-product sales for 1928 aggregated $16,774,672.59 while the total for 1927 was $13,016,539.68.

Savings at the Ford plants ranged from platinum to floor sweepings. Waste wood from the sawmill and body plant of the Ford Motor Company in northern Michigan was conveyed to one of the most completely equipped chemical plants in the world, where it was converted into charcoal briquets and industrial chemicals. Slag was sold in the Detroit area for surfacing roads.

There was a gain of $110,846 in the value of ammonium sulphate, which is sold by Ford dealers over the country to farmers and gardeners for fertilizer.

Capacity of the coke ovens was increased during the year in order to obtain gas for the operation of the Rouge plant, and coke was sold in Detroit, shipped by rail to points in Michigan and by water to Great Lakes cities. Benzol, sold for motor fuel in Detroit, gave the Ford company a greater return by $795,383 in 1928. There was also a substantial increase in the return from glass sales.

Coal from the Ford-owned mines in eastern Kentucky was sold by rail shipment to coal dealers in the Middle West and from the Ford dock at Duluth, Minn., for use in the Northwest. The by-product report also included the sale of Johansson gages.

## Chrysler Plant Expanding

NEWCASTLE, IND., March 11—The local plant of the Chrysler Motor Corp. will add a 160 ft. by 360 ft. building to the machine shop, according to F. D. Brehner, plant manager. The new building will contain 57,600 ft. of floor space and will provide employment for 200 additional men. Work on it will be completed by April 1. An addition to the forge room, begun some time ago, is nearly completed.

## *State Road Aid Cut; Counties Carry On*

**DES MOINES, March 11—Iowa's $100,000,000 road bond issue, which constituted practically the sole work of a special legislative session last summer, has been held unconstitutional by the state Supreme Court, which ruled, in effect, that money raised by the bonds cannot be used in the manner contemplated.**

**Scores of counties will proceed with their county bond issue road building programs, it was announced, with expectation of getting refunds through future legislation and the program for this year, at least, will be undisturbed by the court opinion.**

## Warner Resigns Navy Post; Becomes Air Consultant

WASHINGTON, D. C., March 11—Edward P. Warner, first vice-president of the Society of Automotive Engineers, has resigned as Assistant Secretary of the Navy for Aviation, David S. Ingalls of Cleveland having been appointed by President Herbert Hoover to fill that post.

Mr. Warner plans to establish offices as an aeronautical consultant. He has occupied the position of Assistant Secretary of the Navy for Aviation ever since the creation of that office in 1926. He is the author of several authoritative books on aeronautic engineering topics, as well as of numerous technical articles dealing with both aeronautic and automotive subjects. Prior to his entrance into the government service, Mr. Warner was professor of aeronautic engineering at the Massachusetts Institute of Technology.

# Macauley Predicts Record Production

DETROIT, March 12—Announcing a 10 per cent gain of increase thus far in 1929 compared with the same period in 1928, Alvan Macauley, president of the National Automobile Chamber of Commerce, indicated that this would be the best year in the motor industry, speaking before the Members' Meeting of the National Automobile Chamber of Commerce in the Book-Cadillac Hotel, Detroit, last week.

"The industry may look forward to the best year in its history, based on increases in general prosperity both here and abroad as well as on a more intensive use of motor transportation.

"In the United States, highway construction is going forward at the rate of 40,000 to 50,000 miles of hard surfaced roads per year. As rapidly as these roads are built, bus lines are being installed and high grade commercial vehicle delivery service is being instituted.

"Passenger car trade is continuing active, especially because the cars in all price classes are being offered at the best values in the history of our business.

"Our export trade was close to 850,000 vehicles during the past year and each car owner is, by his example, a salesman for motor transportation. Experience in the United States has shown that the more cars there are in the field the better is the market."

## Stuebing Cowan Expands

CINCINNATI, March 11—The Stuebing Cowan Co., maker of lift and industrial trucks and skids, with general offices in Cincinnati, recently enlarged its Holyoke plant, tripling the capacity, according to officials.

### Budd Books Willys' Orders

PHILADELPHIA, March 11—Willys-Overland, Inc. of Toledo, Ohio, has placed orders totaling $2,500,000 with the Budd Wheel Company of Philadelphia and Detroit, according to an announcement by Edward G. Budd, president. The orders cover a new type wire wheel.

# Calendar of Coming Events

### SHOWS

Geneva Automobile Show .....Mar. 14-24
Lyons, Fair .....Mar. 4-18
Nice, Automobiles .....Mar. 5-20
Marseilles, Automobiles.....Mar. 17-28
Nantes, Commercial .....Apr. 4-15
Lille, Commercial .....Apr. 6-21
All-American Aircraft Show, Detroit Board of Commerce, Detroit..Apr. 6-14
Milan, Trucks .....Apr. 12-27
Jugo-Slavia, Automobiles .....Apr. 20-28
Budapest Auto Salon .....May
Melbourne Automobile Show .....May 2-11
International Aircraft Exhibition, Olympia, London .....July 16-27
International Aircraft Exhibit, Coliseum, Chicago .....Sept. 7-15
Paris, Automobiles .....Oct. 3-13
London, Automobiles .....Oct. 17-26
Prague, Automobiles .....Oct. 23-30
Paris, Motorcycles .....Oct. 23-Nov. 3
M.&E.A. Show, Chicago .....Nov. 4-9
N.S.P.A.Show and Convention, Detroit, Nov. 11-16
Berlin Auto Salon .....Nov. 14
London, Trucks .....Nov. 7-16
Paris, Trucks .....Nov. 14-24
London, Motorcycles.....Nov. 30-Dec. 7
Brussels Auto Salon .....Dec. 7

### CONVENTIONS

Marketing Executives Conference, Hotel Gibson, Cincinnati .....April 3-5
Annual Meeting National Foreign Trade Council, Baltimore .....April 17-19
American Society of Mechanical Engineers, Detroit .....May 1-3
American Management Association, New York .....May 6-11
National Highway Traffic Association, Hotel Stevens, Chicago.....May 13-15

### RACES

Akron .....May 12
Gardner Trophy (Aircraft), St. Louis, May 28-30
Indianapolis .....May 30
Detroit .....June 9
Altoona, Pa. .....June 15
Salem, N. H. .....June 29
French Grand Prix .....June 30
Akron .....Aug. 18
Syracuse .....Aug. 31
Altoona, Pa. .....Sept. 2
Cleveland .....Sept. 15
Salem, N. H. .....Oct. 12

### S. A. E.

Summer Meeting, Saranac Lake..June 25-28